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Coal Gas Explosion Research

IT is a curious commentary upon the march of civilisation and the increasing amenities of life, brought about largely through the increased application of power and heat, that mankind now walks in danger of the escape of that very giant whom he professes to have harnessed for his own comfort. Solid coal mixed with air, and the products obtained from that coal, can be explosives of deadly force. The annual report of the Explosives Department of the U.S. Bureau of Mines devotes a good deal of space to the subject of explosions in underground mains. Modern city development has led to the creation of serious potential hazards arising from the presence of confined spaces beneath the streets into which inflammable gases may leak from gas mains, in which inflammable liquids and vapours may accumulate by drainage where gases may be generated by electrolysis, or which may accumulate gases through the degeneration of sewage or other organic material.

These dangers, it is pointed out, have been increased greatly by the widespread use of impervious paving and sealing materials, which tend to prevent normal escape of gases to the free air by diffusion and leakage. It is further indicated very definitely that the control of these conditions is a job for the chemist, since widespread vigilance is necessary to detect and eliminate these hazards.

The methods in use as developed by a joint investigation of the Bureau and the City of Boston are set forth in the report. In short, they comprise periodic testing of key manholes; when one of these shows the presence of gas, all the manholes in the vicinity are tested until five consecutive manholes are found to be free from gas. Once the presence of gas is known it can soon be dissipated. The contamination of manhole atmospheres has been found to be due to two sources. One of these is town's gas, recognised by containing hydrogen, carbon monoxide, methane, ethane and other hydrocarbons; the other which has an abnormally high carbon dioxide content, with varying amounts of methane and low percentages of oxygen—generally non-explosive—arises from reaction products from bacterial or other reactions taking place in the soil. It is curious that no dangerous atmospheres are mentioned as arising from electrolysis or from electrical heating of cables.

It is not only from explosions that danger arises beneath our streets, since toxic and suffocating gases may also be generated. Carbon monoxide and hydrogen sulphide are the two most important poisonous gases encountered in underground openings, but ammonia and sulphur dioxide may also be met. The suffocating gases, of course, have generally no odour. Typical suffocating atmospheres recorded by the Bureau may contain from traces to 17 per cent. of carbon dioxide from 1 to 8 per cent. of oxygen, from zero to 10 per cent. of methane, and sometimes to consist, in the U.S.A., simply of a high proportion of natural gas that has escaped from natural gas mains. These gases may be produced by bacterial action and seem to occur on damp, foggy, still days when there is not much natural ventilation. The conclusion could be drawn from the Report that a staff of chemists is becoming necessary in every large town to safeguard the citizens, and those who work in the sewers and passages beneath our streets from sudden peril due to a foe of unusual insidiousness. Those perils arise in houses as well as in streets since leakage from sewer to house has often been known to occur.

Another interesting observation contained in the Bureau's Report is the disappearance of carbon monoxide due to bacterial action. This was noted in the after-gases from an anthracite mine fire under conditions precluding air infiltration or absorption or reaction with the anthracite. It was then found that a mixture of liquid and slime consisting of rotted wood, fungi, manure and sewage materials reacted energetically upon gas mixtures containing carbon monoxide and hydrogen, completely removing both gases from a synthetic mine-fire atmosphere in 10 to 14 days. It was further found not to be necessary for the solid decaying organic matter to be present, but the supernatant liquid was found to be sufficient in itself.

The ramifications of bio-chemistry appear to be unending and the hint given recently in a well-known scientific periodical that bio-chemistry was likely to be the most promising branch for a young man to take up seem likely to be fulfilled within the lifetime of the next generation. The bacteria may be a source of health in destroying poisonous gases, or of danger in generating suffocating atmospheres.

I think we may say that the application of fundamental discoveries in science to purposes of war is altogether too remote for it to be possible to control such discoveries at the source. . . . The world is ready to accept the gifts of science, and to use them for its own purposes. It is difficult to see any sign that it is ready to accept the advice of scientific men as to what those uses should be.—Lord Rayleigh.

NOTES AND COMMENTS

Last Month's Overseas Trade

ON the whole the Board of Trade returns for last month's overseas trade must be considered to be distinctly encouraging. Export trade showed a further substantial increase both over the June figures and over those for July of last year; the expansion compared with July, 1938, was 7·7 per cent. on a daily average basis. Imports were also higher than in July a year ago, but were below the June import figures. On the first seven months of the year, imports are down by more than £17 millions, and the gain in exports gives a reduction in the adverse trade balance of no less than £24 millions. According to the returns, the trade in chemicals, drugs, dyes and colours (details of which are given on another page) showed considerable improvement during the month. Exports at £1,975,857 were £306,053 higher than in the corresponding month of 1938, while imports at £1,478,974 were higher by £452,670. The position at the end of the first seven months of this year shows similar improvement over the first seven months of 1938.

Industrialisation of the Highlands

THE industrialisation of the Scottish Highlands has been a question of policy on which the greatest controversy has raged. Since the Caledonian Bill for hydro-electric and carbide schemes was rejected by Parliament, Scottish opinion on this problem has changed a good deal and it was fully expected that the Secretary of State for Scotland (Mr. Colville) would refer to it in the House of Commons recently when he revealed his proposals for the improvement of economic conditions in the Highlands. Industrialisation was not, however, included in his remarks, although a Scottish correspondent reported recently that while a Government grant to a new carbide scheme was not considered practical politics, certain group interests hoped that a new carbide scheme for the Inverness-shire Highlands would meet with strong Government support. The view is widely shared that once one important industry became established in the Highlands others would most certainly follow. The subject will doubtless receive further consideration from Mr. Colville, who assured the House of Commons that he was alive to the importance of ensuring that the problems of the Highlands and Islands were considered as a whole and for that purpose he proposed at regular intervals to hold conferences with the Departments concerned in order to review the situation.

German Sulphuric Acid Plant Expansion

THE German sulphuric acid industry has made a considerable expansion in the last few years, owing to the rapid development of the consuming industries. The production of monohydrate in 1932 was 93,500 metric tons, compared with 2,050,000 tons in 1937, when three additional sulphuric acid plants were brought into operation, bringing the total number in production in Germany up to sixty-six. Towards the end of 1938 a new sulphuric acid plant with a daily output of about 55 metric tons started operations at Affecking, Upper Bavaria. The plant, which is controlled by the Bayerische A.G. für Chemische und Landwirtschaftliche Fabrikate, operates on the contact system, and uses exclusively as raw material locally-mined iron pyrites. The plant is noteworthy in that it is the first to be operated upon Bavarian iron pyrites as raw material, and an expansion in the output of Bavarian iron pyrites is naturally foreshadowed. In the past, the bulk of Germany's output of iron pyrites has been furnished by Westphalian mines. Germany's output of iron pyrites showed considerable expansion in 1937, rising to the record level of 424,100 metric tons, compared with 285,500 tons in 1936, and 175,200 tons in 1932. It seems that there was only a relatively small increase in output from the Westphalian mines, as these were already worked to nearly full capacity in 1937. Another new and much larger sulphuric acid plant is under construction at Moosbierbaum, Austria, by the leading Austrian chemical concern, Skoda-Wetzler A.G., the plant constructional work of which started in February of this year. This will not only be the largest sulphuric acid works in Austria, but one of the largest in the greater Reich. It is said that it will represent a capital investment of about 3,000,000 marks.

Sealing Platinum to Glass

THE general problem of joining metals and glasses has been studied by many investigators, but the fact that the thermal expansions of platinum and glass are so different has always caused trouble. Thus, when a platinum wire or rod is coated with hot glass, subsequent cooling will crack the glass or pull it loose from the metal. According to a note in the current issue of the *Journal of the Franklin Institute* Wichers and Saylor, of the U.S. National Bureau of Standards, have surmounted this difficulty by using a seamless tube of platinum instead of a wire or rod. If the walls of the tube are thin as compared with its length (say a ratio of 1 to 12), the shrinkage forces are not great enough to crack the glass internally or to pull the metal away from it. In the case of a platinum tube within a glass tube, the relative dimensions of the glass enclosing wall also affect the tension of the boundary. The lower limit for the ratio of diameter to wall-thickness of the glass for this type of seal is set by the resistance of the glass to failure by cracking of the entire wall. In addition to direct testing for vacuum-tightness, seals made at the Bureau have been examined microscopically to find whether any strains existed, to discover internal cracking, and to locate possible separations of the metal from the glass. The mechanical principles governing the platinum-pyrex seals can also be applied to other metal-glass seals of the tubular type. From a knowledge of the mechanical and thermal properties of particular glasses and metals, the dimensions of parts of the two materials which are likely to yield satisfactory seals can be calculated. If the cross-section of a thin-walled metal tube is insufficient to accomplish a desired purpose, such as the introduction of a given electrical current into an apparatus, a rod with a short tubular jacket welded to it can be used. The new type of seal is simple to construct, and therefore does not require any unusual apparatus or extraordinary skill in glass-blowing.

Growth of the Swedish Chemical Industry

THE Swedish chemical industry has been developing considerably during the last few years and the country is now able to cover its requirements for a number of industrial chemicals, certain fertilisers and some toilet preparations, paints and miscellaneous chemical products. In spte of this, however, annual imports of chemicals and allied products are considerable. In 1938, imports of industrial chemicals, medicinals, dyes, paints, lacquers, soaps and fertilisers showed an increase in value of 3 per cent. over 1937, and this expansion continued into the first quarter of 1939, when imports were 11 per cent. greater than during the corresponding quarter of 1938. Conflicting trends characterised the Swedish

chemical industry and trade in 1938, the office of the American Commercial Attache at Stockholm reported. In the chemical processing industries, such as chemical wood pulp, charcoal burning, gas works and similar lines, domestic output was curtailed while expansion was reported in chemicals, explosives, pharmaceuticals and fertilisers. Total consumption was estimated by the trade to have reached a new record in 1938 owing to increased operations in some of the domestic consuming industries and to Government purchases. As the diminished output of some products was apparently more than offset by increased production in others, the amount of chemicals manufactured in 1938 will undoubtedly show an increase in volume, but a decline in value when figures are available.

"Heat May Be Generated"

IN an able dissertation on international affairs which appeared in the editorial columns of *Chemistry and Industry* on August 5, Germany's complaints of encirclement are summed up in the following appropriately worded phrases: "The more vehemently the molecules bound against the sides of the container the more vigorously are they repelled; the pressure increases and heat may be generated. . . . Germany is encircled geographically and so are Switzerland, Poland and some other countries. . . . The more Germany, Switzerland and Poland fight against encirclement the stronger it becomes. . . . It may be necessary at the present time, and it probably is, for the countries of Europe to arm to the teeth, to send their bombing aeroplanes all over the Continent, and keep their fleets in a great state of readiness and activity. It may be necessary for them to spend money far beyond what they can afford until one or another cannot continue the process. None of these things seems to us to get nearer to a solution of the trouble. When we know the causes of the trouble we shall probably know the remedy, but it does not follow that the time will be ripe for starting the remedy. The difficulty that exasperates Germany and Poland may be an excuse for a European war, but it is not in reality a cause of any possible war. The difficulty is an irritation, a symptom of a disease, and our business as people capable of thought is to find out the disease, quieten the patient and cure him."

NATIONAL SERVICE

Special Offer to Subscribers

TO enable subscribers to THE CHEMICAL AGE called up for service under the Military Training Act to keep in touch with the trade, the proprietors have pleasure in announcing the following concession: To all militiamen, naval reservists, territorials, or others called away from business for National Service, who are paid subscribers to THE CHEMICAL AGE, or are employees of a paid subscriber, the journal is offered free during their period of service. Eligible readers wishing to take advantage of this offer should, as soon as they receive their calling up papers, write to the Circulation Manager of THE CHEMICAL AGE stating the address to which they wish the journal to be sent.

Letters to the Editor

Large Industrial Units

SIR,—I feel that some comment is required on "J.B.'s" letter on "Large Industrial Units," published in your last week's issue. He states that "'big battalions' have obviously come to stay, but their importance must not blind us to the still more vital function of the small business unit in our economic life." It is difficult to see in what way the small business unit plays a more important part than the big industrial concern. Surely a unit with the share capital of, say, one-twentieth of another unit cannot have nearly so much effect in the industry to which it belongs. While everyone will agree with his commendation of individual initiative in setting up small private enterprises, the value of such enterprises only lies in their ability to grow to such an extent that they become one of the big battalions of industry.

Small industrial units are very liable to suffer from cut-throat competition which cannot but be a great deterrent to industrial progress. Moreover, difficulty has been experienced in the past in voicing the common opinion of these small units on matters affecting the trade as a whole. For this reason, trade associations were formed so that smaller units might express their opinions along with their bigger brethren. The extraordinary growth of trade associations and the great value of their services to their members has been widely praised. One can almost say that the "big battalion" is almost a trade association of its own. Within its organisation it is so sectionalised and grouped that each group acts in matters of broad policy in much the same way as a member of a trade association.

Further, your correspondent's contention that new ideas and experiments can be tried out more quickly in the smaller unit than in the large concern is not borne out by fact. The organisation of the present-day large industrial concern is such that executive responsibility is delegated to the heads of the groups comprising the organisation, with the result that little delay is incurred. But perhaps the biggest advantage of the big concern lies in its ability to promote industrial and scientific research. The small unit often has not the funds to indulge in either short or long-term research, nor, indeed, the financial backing to put the results of those researches into a productive process on the large scale.—Yours faithfully,

M. BALL.

London, S.E.24. August 16.

Linseed Imports

Drawback Schemes Amended

THE Treasury has issued the Import Duties (Drawback) (No. 3) Order, 1939, providing for the amendment of certain of the linseed drawback schemes. Its effect is to withdraw the allowance of drawback in respect of linseed used in the manufacture of certain goods, such as mixed oils, paints, linoleum, and thereby limit the allowance of drawback in respect of linseed to the quantity used in the manufacture of linseed oil not mixed with any substance other than driers. It also provides for the revocation of the scheme of drawback approved by the Import Duties (Drawback) (No. 5) Order, 1937, in respect of ground nuts used in the manufacture of ground nut oil.

The order has been made to implement Article 6 of the United Kingdom-India Trade Agreement signed on March 20.

The Treasury has also issued an order which reduces the rate of drawback in respect of linseed used in the manufacture of unmixed linseed oil. This reduction is consequent upon a fall in the average price of imported foreign linseed. This order also amends certain of the figures in the drawback scheme for linseed oil used in the manufacture of linoleum.

BY-PRODUCT COKING

Plant Completed at Ebbw Vale Works of Richard Thomas & Co., Ltd.

WORK has been completed on the installation of the new by-product coking plant at the Ebbw Vale Works of Richard Thomas and Co., Ltd. The installation comprises a fully equipped battery of 65 W-D Becker coke ovens; coal handling, blending, crushing and storage equipment; coke screening and handling plant; by-product recovery plant; benzole recovery plant; and water cooling and re-circulation equipment.

Washed coal is received in wagons, which are discharged by a wagon tipper into a coal reception hopper. From this any large coal is delivered by a belt conveyor to a primary crusher, while small coal is by-passed. The coal then travels on belts to the top of a range of blending bunkers. The different classes of coal are distributed into the appropriate bunkers by means of a shuttle belt conveyor, and are discharged from these bunkers at rates pre-determined by the setting of a plough on the rotary feed table fitted under each bunker. Thus the required proportions of the various coals in the blend are automatically obtained.

Intimate Mixing

The blended coals are conveyed by the blending belt to pulverisers which reduce them to a fine state and ensure intimate mixing. The coal is then delivered by belts to the top of a 3,000-tons capacity bunker at the ovens battery, and is distributed into the bunker by a revolving shuttle belt. These ovens are of the W-D Becker regenerative combination type. They are each 40 ft. 8 in. long between doors, and 12 ft. 6 in. high, and have an average width of 16 in. Their holding capacity is 624 cu. ft. and, when carbonising coal containing 10 per cent. moisture, the battery can produce 6,300 tons a week of blast furnace coke. Coke from the ovens is quenched at a central station and discharged on a large wharf, whence, after cooling, it is conveyed by belts to the screening station.

The by-product plant is of the semi-direct type, with equipment for the recovery of crude tar, neutral sulphate of ammonia and crude benzole, the benzole being rectified in an existing plant for the production of motor spirit.

Gas leaving the benzole scrubbers normally passes to a small holder at the coke oven plant, designed to maintain pressure on the battery when coke oven gas is being used for underfiring. In these circumstances the gas required for the battery is diverted to it before reaching the holder. The surplus coke oven gas (or when blast furnace gas is being used for underfiring, the whole of the coke oven gas) passes from the coke oven plant holder to the main works coke oven gasholder for distribution to the various departments of the steel works.

Arrangement of Ovens

The 65 ovens are arranged in a single battery with the ovens bunker at one end and the stack at the other. Waste gas flues, constructed of concrete integral with the oven pad and brick lined, are built along each side of the battery and connect into the stack, placed at the end of the battery away from the bunker. The stack is 250 ft. high, and is firebrick-lined for the first 70 ft. above the waste gas flue inlet.

The heating system of the W-D Becker oven consists of a series of vertical flues between each oven and the next, and one series at each end of the battery to provide for heating the outer walls of the end ovens. Under each series of vertical flues are built two regenerators, filled with chequer brick.

When blast-furnace gas is employed as the heating medium, one regenerator is used for preheating the blast-furnace gas, while the other is used for preheating the air for combustion. When coke oven gas is used for heating the ovens, both regenerators are used for preheating the air for combustion.

The blast-furnace gas main originates from the works blast-furnace gasholder; the coke-oven-gas fuel main originates at the outlet of the benzole scrubbers, connecting into an underground line to the battery. Both fuel gas mains are fitted with suitable regulating valves and fuel-gas meters.

The crude gas leaves the ovens through ascension-pipes and passes into a steel gas collecting main. One ascension-pipe, lined with special insulating material, is provided for each oven, and each pipe is fitted with a spray for liquor-flushing. Sprays are also provided in the main at alternative ovens. The offtake-pipes are also fitted with steam services, whereby steam may be injected during the oven-charging operation to create a pull on the oven and reduce smoke and gas-emission.

The collecting-main is equipped with a bleeder at each end and is designed with a slop from the ends towards the centre at which a cast-steel gas offtake is fitted. To it is connected a suction main supported on a steel bridge over the quenching-car track and railway sidings. This main terminates at a downcomer before the primary coolers. The gas and flushing-liquor pass through the suction main, the flushing liquor being returned at the downcomer to a liquor flushing and separating tank of approximately 42,000 gal. capacity.

The gas passes from the ovens to the primary coolers, which are of the vertical-tube, water-cooled type. Two coolers are normally in operation, with the third as a standby. In these coolers tar and ammoniacal liquor are condensed. From the primary coolers, the cooled gas is passed by the exhausters to two W.W-D electro-detarrers of the vertical-tube, suspended-wire electrode type, in which the tar particles entrained in the gas are precipitated by a discharge of high-tension current.

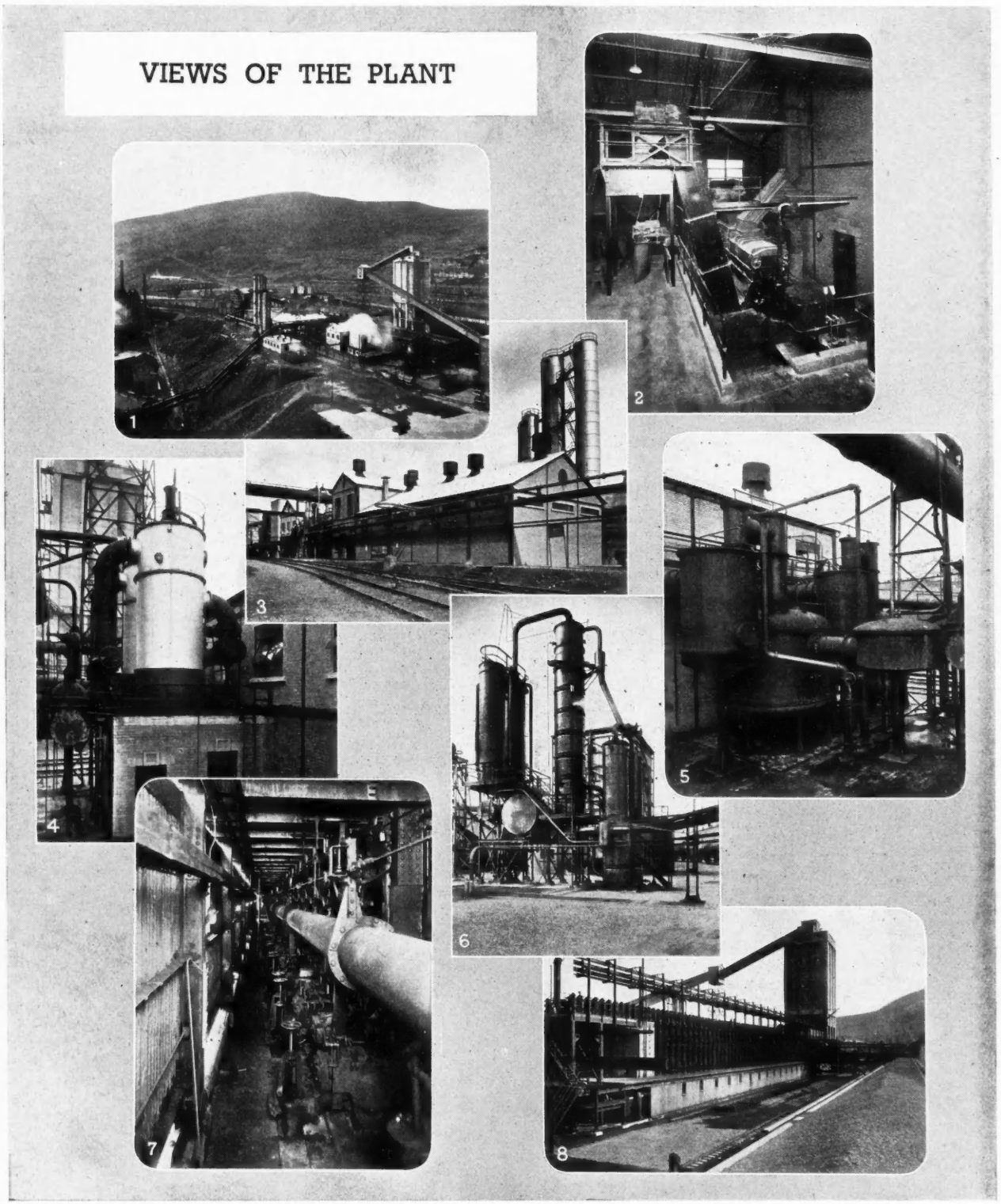
Production of Sulphate

Two re-heaters are provided, one as a spare, for re-heating the gas leaving the detarrers, before it enters the ammonia-saturators. Two saturators are installed, one acting as a standby. The wet sulphate is delivered by the pumps to one of two drain-tables, consisting of cast-iron boxes lined with lead, each provided with an overflow, two movable copper delivery spouts, two acid-proof ball-valves and a drip pan.

After draining, the sulphate is dried in centrifuges, three of which are provided, each having a capacity of approximately 600 lb. of sulphate. These are fitted with copper baskets and wooden discharge-chutes and are driven by electric motors through hydraulic couplings. The ammonia liquor produced in the plant is pumped to a still composed of two sections. The free section contains six trays and the fixed section nine. The ammonia vapour released passes into the gas stream immediately before it enters the saturators.

After leaving the saturators and acid-separators, the gas passes through a final cooler, 75 ft. high and packed with wooden hurdles. The gas passes up through the towers and meets a descending stream of water. Naphthalene is deposited in this cooler and passes with the water to a concrete naphthalene separating sump. After final cooling, the gas is debenzolised in two tower type scrubbers 100 ft. high, which are also packed with wooden hurdles over which the wash oil descends, meeting the rising stream of gas and absorbing the benzole.

The water-cooling and recirculating plant is designed to cool and recirculate the whole of the water used at the by-product and benzole plants. Two cooling frames are installed; the larger frame deals with the water used in the primary coolers and the other indirect coolers on the plant; and the second frame deals with water used at the final gas cooler. Both work on closed circuits, so that the water which has been in contact with gas in the direct type final cooler does not come into contact with the remaining coolers which are of the indirect type.



1. General view of the by-product plant. 2. The Wilton drier and neutraliser, sulphate elevator and bagging hopper and scale. 3. General view of the by-product plant, showing from right to left, the sulphate house, with the benzole scrubbers and final cooler behind, the electro-detarrers, the exhauster house, and the primary coolers. 4. The W.W-D electro-detarrers on their generator house. 5. View showing from right to left, a reheater, saturator and acid separator. 6. General view of the benzole plant, showing, from left to right, the vapour-to-oil heat-exchanger, hot oil drain-tank, wash oil still and final heaters. 7. One of the alley-ways, showing the coke oven fuel gas main with the gas-gun connections above the reversing valves below. 8. The pusher side of the oven battery.

British Overseas Chemical Trade in July

ACCORDING to the Board of Trade returns for the month ended July 31, 1939, imports of chemicals, drugs, dyes and colours were valued at £1,478,974, an increase of £452,670 compared with July, 1938. Exports were valued at £1,975,857, an increase of £306,053. Re-exports were valued at £52,402.

Imports

	Quantities. July 31, 1938.	Quantities. July 31, 1939.	Values. July 31, 1938.	Values. July 31, 1939.
Acids—				
Acetic .. .. cwt.	7,303	10,289	9,400	12,751
Boric (boracic) .. ,,	1,280	7,930	1,505	8,502
Citric .. .. ,,	2,010	2,495	8,031	10,150
Tartaric .. ,,	1,920	3,190	8,855	14,851
All other sorts .. value	—	—	5,502	8,999
Borax .. .. cwt.	7,105	24,920	4,515	15,627
Calcium carbide .. ,,	85,792	136,732	40,159	59,967
Fertilisers, manufactured tons	2,186	3,046	12,568	14,433
Potassium compounds—				
Caustic and lyes cwt.	6,494	11,626	8,505	13,046
Chloride (muriate) ,,	87,002	435,682	31,015	147,992
Kainite and other potassium fertiliser salts cwt.	62,867	192,078	12,215	40,077
Nitrate (saltpetre) ,,	3,723	9,716	2,966	8,049
Sulphate .. ,,	70,800	158,194	32,926	71,379
All other compounds ,,	9,339	12,212	11,337	14,772
Sodium compounds—				
Chlorate .. .. ,,	1,210	2,066	1,437	2,449
Chromate and bichromate .. .. cwt.	1,498	3,362	1,859	4,656
Cyanide .. ,,	9,186	180	22,400	523
Nitrate .. .. ,,	94,114	157,681	28,537	37,108
All other compounds ,,	16,008	20,607	15,051	18,131
Chemical manufactures value	—	—	339,679	372,605
Drugs, medicines and medicinal preparations—				
Manufactured or prepared—				
Quinine and quinine salts .. .. oz.	84,801	155,735	7,321	14,051
Medicinal oils .. cwt.	4,225	3,634	12,576	10,748
Proprietary medicines value	—	—	82,280	86,493
All other sorts .. ,,	—	—	37,717	44,895
Finished dye-stuffs obtained from coal tar cwt.	2,763	5,161	85,068	159,258
Extracts for dyeing ,,	3,770	4,233	7,162	11,746
Extracts for tanning—				
Chestnut .. cwt.	16,427	31,874	11,825	22,447
Quebracho .. ,,	12,680	37,918	11,718	34,836
All other sorts .. ,,	28,250	67,178	22,639	54,555
All other dyes and dye-stuffs .. .. cwt.	337	1,021	4,648	21,395
Painters' and printers' colours and materials—				
White lead (basic carbonate) .. cwt.	5,748	5,310	7,928	7,207
Ochres and earth colours cwt.	68,200	34,189	20,388	10,911
Bronze powders and other metallic pigments .. .. cwt.	1,344	1,562	9,968	12,428
Carbon blacks .. ,,	44,639	41,508	56,160	56,768
Other pigments and extenders, dry .. cwt.	45,964	36,171	10,711	8,850
Lithopone .. .. ,,	25,385	26,834	15,914	15,843
All other descriptions ,,	10,028	14,564	23,819	30,476
Total .. .. value	—	—	1,026,304	1,478,974

Exports

Acids—				
Citric .. .. cwt.	2,120	3,274	9,451	14,246
All other sorts .. value	—	—	21,388	26,682
Aluminium compounds tons	2,717	2,296	21,905	16,650
Ammonium compounds—				
Sulphate .. tons	21,722	27,062	140,252	179,192
All other sorts .. ,,	1,583	2,276	20,532	27,035
Bleaching materials—				
Bleaching powder (chloride of lime) .. cwt.	35,191	50,516	10,693	15,836
All other sorts .. ,,	3,332	9,229	7,454	19,069
Coal tar products—				
Cresylic acid .. galls.	81,893	142,022	12,697	15,556
Tar oil, creosote oil ,,	2,198,864	1,999,170	55,500	35,220
All other sorts .. value	—	—	11,888	10,625
Copper, sulphate of tons	1,669	3,084	25,416	47,236
Disinfectants, insecticides, etc. .. .. cwt.	31,006	33,398	67,661	74,137
Fertilisers, manufactured tons	14,313	10,188	57,607	43,551
Glycerine .. .. cwt.	4,225	14,664	14,458	36,080
Lead compounds .. ,,	14,235	13,067	19,519	19,135
Magnesium compounds tons	338	496	9,187	11,351
Potassium compounds cwt.	5,580	4,142	9,577	10,740
Salt (sodium chloride) tons	27,650	21,893	72,231	60,911
Sodium compounds—				
Carbonate, including soda crystals, soda ash and bicarbonate cwt.	255,565	301,816	60,228	73,731
Caustic .. .. ,,	152,133	224,521	79,889	121,644
Silicate (water glass) ,,	16,288	17,260	4,425	5,642
Sulphate, including salt cake .. .. cwt.	68,830	99,123	8,682	12,113
All other sorts .. ,,	48,586	57,646	86,890	89,745
Zinc oxide .. .. tons	1,121	1,412	20,227	25,035
All other descriptions value	—	—	182,617	229,011
Chemical manufactures and products .. value	—	—	20,760	35,255
Drugs, medicines and medicinal preparations value	—	—	15,359	13,693
Drugs, medicines and medicinal preparations—				
Quinine and quinine salts .. .. oz.	113,463	188,661	12,303	23,405
Proprietary medicines value	—	—	111,796	106,272
All other descriptions value	—	—	127,823	169,018
Dyes and dye-stuffs and extracts for dyeing and tanning—				
Finished dye-stuffs obtained from coal tar—				
Alizarine, alizarine red and indigo (synthetic) cwt.	166	948	1,862	7,351
Other sorts .. ,,	5,275	6,788	75,635	112,729
Extracts for tanning ,,	11,991	16,957	10,884	15,970
All other descriptions ,,	1,454	1,580	8,194	6,176
Painters' and printers' colours and materials—				
Ochres and earth colours cwt.	9,624	12,475	9,264	12,461
Other descriptions specified in Export List cwt.	7,325	8,284	27,449	26,879
White lead .. ,,	3,928	4,194	7,686	8,259
Ships' bottom compositions .. .. cwt.	2,562	1,787	8,443	5,590
Lithopone .. .. ,,	11,777	11,135	9,383	8,099
Paints and painters' enamels .. .. cwt.	35,953	38,507	107,563	113,265
Varnish and lacquer (clear) galls.	65,328	71,308	27,514	29,107
Printers' ink .. cwt.	4,496	5,287	24,340	27,681
All other descriptions ,,	37,018	45,265	69,291	83,476
Total .. .. value	—	—	1,669,804	1,975,857

Re-Exports

Dyes and dye-stuffs and extracts for dyeing and tanning .. .. cwt.	237	262	2,767	2,347
Painters' and printers' colours and materials cwt.	803	386	1,217	1,107
Total .. .. value	—	—	40,103	52,402

VERMICULITE

A Mineral of Increasing Commercial Application

By

C. C. DOWNIE

VERMICULITE is a material which has seldom been discussed in the literature because of the paucity of details available. It is doubtful if it was mined to any appreciable extent before the year 1930, but since then the expansion of building schemes has led to widely developed applications. One of its principal uses is in the insulation of houses, where a layer of grains of vermiculite is laid on ceilings, or held by cloth; in conjunction with different cements and binders, it has been formed into plasters for acoustic purposes.

Statistics from the U.S. Bureau of Mines show that while in 1936 the sales of vermiculite were 16,733 tons, this figure was increased to 24,556 tons in 1937. Although the U.S.A. at the present moment appears to be the greatest producer, it is also being developed in Russia, while vast deposits have still more recently been discovered in Transvaal, South Africa. Austrian refractory manufacturers had a reputation for the production of special light refractories for thermal insulation purposes, but for many years it was not realised that the success attained was due to an admixture of a then little known mineral, now recognised as vermiculite.

House building claims the greatest use for the mineral, since it may be included in wirescreen or spread-metal bratticing under the roof tile or sheeting, and this application is as yet only in its infancy. As a substitute for asbestos, vermiculite has already been used for thermal insulation of large furnaces, and particularly for "shell-linings." With ordinary furnaces it is laid on the roofs and walls, being held in position by bricks, but the electric furnace uses it directly against the outer metal shell.

When vermiculite was first isolated it was paid but little attention, and was simply quoted in mineralogical works as a chlorite occurring in tubular, radiating, and granular forms. A totally different state of affairs arose when it was realised that by means of careful heating, vermiculite developed the property of exfoliating. The product so obtained is known as expanded vermiculite, which in bulk possesses an exceedingly low specific gravity, sometimes less than that of cork, and hence its great possibilities for insulation purposes. Whereas cork, and cork-substitutes are inflammable, vermiculite resists heat in a similar manner to asbestos.

Occurrence and Physical Properties

Vermiculite can be generally regarded as a hydrated mineral derived from certain micas, and the mode of occurrence appears to be similar to that of apatite. It may have been formed by a weathering process, or by a hydro-thermal alteration whereby some of the potash of the mica became leached out. The true definition of the chlorites includes minerals related in composition to the micas, and which are represented by hydrated silicates of aluminium, magnesium, and iron, but more or less free from alkalies. Vermiculite, however, almost invariably contains alkalies, and in extreme cases has been known to contain upwards of 8 per cent. and this really differentiates from the ordinary chlorites. It is usually associated with apatite, pyroxenite, or potash-felspar, but it has also been found associated with other minerals. Vermiculite is not infrequently found in the form of streaks and pockets, and the reason given for this condition is the permeation of the pyroxenite with volatiles such as chlorine, fluorine, phosphorus, and water, which ultimately have led to the deposition.

There are many different grades of vermiculite which previously were more or less ignored, as no commercial possibilities existed for them at that time. The ordinary mineralogist's differentiation had to be made more comprehensive, and instead of simply quoting the colour, crystalline structure, cleavage, common form, and lustre, etc., this has to-day to be supplemented by the manner in which samples expand, since it is upon this quality that ultimate sales of the material will depend. The colour is widely variable, but the most common shades are black, dark brown, light brown to golden yellow, and white. When heated these different samples will expand well, or poorly, some will expand completely, and others imperfectly, while certain varieties pack much better than others. The colour and lustre are only of secondary importance. Some types of vermiculite are soft enough to be scratched by the finger-nail, and in most cases pulverisation is done by means of the disintegrator. The freshly mined material contains a fair proportion of foreign matter, which has to be eliminated by passing over screens, and this is assisted by breaking in a hammer-mill, with further treatment by screening. The fines from the original screening are usually discarded, while different concentration methods are adopted to ensure freedom from dirt, stones, and sand. It is often transported from the mining site without conversion to the expanded form in order to facilitate handling in bulk.

Use as Insulating Material

The subject of expansion is of vital importance to the commercial applications of vermiculite, and from what little information has been made available, it would appear that the work in some respects follows that previously adopted in the handling of diatomaceous-earth products. The modern high-pressure water-tube boiler requires special lagging, and also specially prepared refractories. Much secrecy was originally observed, and the chief reasons for this were the practical difficulties experienced by those who attempted to copy the compositions. The selected diatomaceous earths were mixed with other ingredients which could be ascertained by ordinary chemical analysis, but the physical condition offered a totally different proposition. This was due to the fact that a fixed proportion of cork was added, which was subsequently burned out during the firing. The exceedingly porous condition of the composition made the product light, despite the retention of sufficient strength for boiler insulation purposes, but ordinary chemical analysis could not reveal how this was done.

Vermiculite was at first admixed with rock, which did not furnish the best results, due to the qualities and conditions of the mineral at that time not being fully understood. Insulating material for steam-pipes and refrigerator equipment differs materially from the bricks or blocks actually used in the boiler construction, but vermiculite has been successfully included in each of them, and also in the form of wall-board. The earlier experience of using cork to open up the mass is no longer necessary where vermiculite has been substituted, as the latter can be obtained of lower bulk specific gravity than cork. A cubic foot of cork weighs from 9 to 10 lb., whereas some vermiculites may weigh as little as 4 lb. and in extreme cases have been known to reach $3\frac{1}{2}$ lb. It was this feature which first aroused attention particularly when the thermal conductivity was almost identical.

In order to prepare the expanded material from the raw vermiculite, all that has to be done is to heat it carefully, as opposed to the circuitous method of preparing boiler insulating refractories and burning out cork. Vermiculite has to be heated to between 900° and 1,000° C. for only a matter of seconds, and then cooled as rapidly as possible.

The mass exfoliates due to the loss of combined water, and this will only be successful if the heating is carried out as expeditiously as possible. The result is a granular material possessing an accordion-like structure of exceedingly low specific gravity. Should, however, the heat be continued too long, or alternatively, too great heat be employed, the mass will sink back to a heavier condition, and as such is of little use for commercial purposes. Although this sinking disposition is apparent, the vermiculite has not lost its thermal insulating properties, and in this respect differs materially from many asbestos products which are associated with cotton and other easily decomposed carbonaceous matters. If the mineral was easily fusible, the insulating value would only be of limited value, but on the contrary it does not sinter till about 1,240° C. has been reached, and does not melt under 1,350° C.

Commercial-Scale Expulsion of Water

The expulsion of the combined water is followed by cooling, whereby the structure is maintained in its fully expanded condition, but should mica be present, this will interfere with the expansion and prevent it being complete. Mechanical conveyor belts, which are equipped with links made of the best chrome-steel, are used to pass the mass through the furnace, and when it has reached the desired 900°-1,000° C. it is almost instantly removed for rapid cooling. Where one particular quality of mineral has been handled for some time, the conditions of working are completely standardised, and the mechanism which operates the conveyor belt can be controlled to synchronise within very close limits. Recording pyrometers are used to ensure that the required temperature is obtained, all charts being removed periodically for comparison.

Rapid tests are made of the bulk specific gravity, which is a sufficient indication of how completely the heating has been effected. It was later realised that a more exacting test of the change of structure could be gained by checking the weight per cu. ft. In extreme cases, this reached as high as 35 lb. but as a general rule, the highest figure is about 14 lb. per cu. ft,. while the best grades range from 4 to 6 lb. per cu. ft. The latter grades are thus lighter than re-granulated cork of similar size. The size of the particles is of importance, and the expanded material must be accurately graded prior to packing for the market. Fine material which is not so suitable for insulation purposes is employed in plaster compositions for acoustic purposes. Here the vermiculite is mixed with Plaster of Paris, Portland cement, and Keene's cement, each of which acts as an appropriate binding medium. The same fine mineral is mixed with magnesium oxychloride for production of steam-pipe insulation, and other light-weight, fireproof cork substitutes.

Analysis of Vermiculite

The analysis of vermiculite is from 38 to 45 per cent. silica, 21 to 25 per cent.. magnesia, 6 to 12 per cent. alumina, 5 to 9 per cent. iron oxides, 2 to 7 per cent. potash, 0.5 to 1.5 per cent. soda, 0.5 to 1.5 per cent. titanium oxide, 1.5 to 3 per cent. lime, and from nil to 1 per cent. manganese oxide. Phosphoric oxide is not present in some samples, while in others it reaches nearly 1 per cent., probably due to the presence of associated apatite. Carbon dioxide is present in the raw material, but this is usually evolved during the subsequent burning. Water is present both as moisture and combined water. When properly expanded, vermiculite possesses a thermal conductivity averaging about 1.5 as compared with 1 for cork, and about 3 for asbestos millboard.

It has long been desired to use an insulating medium in close proximity to furnace doors, for protection of the furnace attendants, but much of the material used is known to breakdown and necessitate frequent replacement. Much research has been in progress in order to prepare a vermiculite composition which could do this work, since few samples show any disposition to melt below 1,350° C. and despite the breakdown of the open structure of the expanded mass, it can still be retained in rigid condition. Similar preparations are being tried out for the lagging of steam-pipes, and refrigerating equipment, while wall-boards, similar to asbestos products, are also in development. The metallic lustre exhibited by some samples, has given rise to a possible future use of vermiculite in pigment compositions. The silver, and gold-brown types are chiefly under consideration, but attempts to apply these to vitreous enamels have not been successful. The bonding of vermiculite with clay to form bricks belongs to a different category, and light-weight blocks of this material have been used to some extent in certain furnaces. As a rule, these are employed in conjunction with more refractory bricks such as magnesite, or silica bricks. When supplied to brick-making firms, it is customary to have vermiculite transported in dense condition. In some cases it has been possible to pack it to occupy almost 100 lb. per cu. ft. On reaching the brick factory, it is then subjected to the heat treatment described, when it is converted to material weighing some 6 lb. per cu. ft. In conclusion, it can be said that although vermiculite has only reached what might be termed commercial importance within the past five or six years, every effort has been made to develop its uses to the uttermost, because of valuable physical properties which it possesses, combined with the cheap market price.

The Leading Chemical Nation

United States Succeeds Germany

BOTH in chemical research and in chemical industry the United States has succeeded Germany as the leading nation in the world, according to a survey made by Professor E. J. Crane, of Ohio State University. It is claimed that alone among the major powers, the United States has gained in the number of chemical patents issued duting the past five years, and that the United States and Great Britain account for 40 per cent. of all the scientific periodicals published. Chemists of the United States now produce the greatest volume of published research, with Great Britain second. Germany, which ranked first a decade ago, has dropped to third place. Russia and Japan show striking gains.

"The centre of greatest activity in chemistry both in laboratory and plant was at one time in Germany," Professor Crane says in summarising his survey. "There is increasingly convincing evidence that this centre has moved to the United States. The publication of papers reporting the results of chemical investigations and the issuing of patents on chemical inventions may be regarded as a significant indication, if not as an exact measure, of chemical activity. During the last five years United States patents on chemical subjects have increased 15 per cent. in number over the preceding five years, whereas there has been a decrease of 12 per cent. for the same periods in British patents of chemical interest, a decrease of 23 per cent. for similar French patents and a decrease of 30 per cent. in German chemical patents. Totals for these countries range from approximately 7,000 patents of chemical interest issued in the United States in 1938 to less than 3,000 chemical patents issued in Germany.

"In 1913 more than a third of the published results of chemical research came out of Germany, while the United States provided about one-fifth of these results. The British Empire and France came next with approximately 15 and 13 per cent. respectively, while Russian chemical publication was less than three per cent. and Japanese less than one per cent.

"Ten years ago Germany was still leading in chemical publication but the United States had drawn up to become a close second. Now the United States is leading in chemical activity thus measured, with the British Empire second and Germany third. Russia has passed France to take fourth place. France is fifth, Japan sixth and Italy seventh."

FUME EMISSION

Investigations of Gaseous Effluents from Chemical Works

THE seventy-fifth annual report on Alkali, Etc., Works by the Chief Inspector, published by H.M. Stationery Office (1s.), states that the number of works registered in 1938 was 980, involving the operation of 1,857 processes. The totals, compared with those of last year, show an increase of 22 processes in the same number of works. There have, in particular, been decreases in the number of sulphuric acid, chemical manure and sulphate of ammonia processes, whilst increased numbers of gas liquor, chlorine and benzene processes have been registered.

A number of complaints, which referred to unregistered as well as to registered processes have been investigated and in most cases some amelioration has been secured. In this connection it is to be remembered that the registered processes are those which by their nature are potential offenders against the amenities and the fact that comparatively little annoyance is caused, speaks well for the ability of the chemical industry to control its noxious emissions and, in general, its willingness to co-operate with the Alkali Inspectors to that end.

It is much to be regretted, the report continues, that the improved conditions in the chemical trade reported last year have not continued although the fertiliser trade has appeared to hold its own and the cement industry has possibly shown some little increase in output. Many coke ovens have been on half output or less and have put coke to stock. In October, conditions improved somewhat, but output has not reached the high level attained last year. Nevertheless, a number of new coking batteries have been built.

Partly due no doubt to the fact that most plants have been working well within the limits of their efficient capacity, there has been a marked reduction in the number of cases where infractions of the provisions of the Act have been noted.

Complaints apart from those of Smoke

A number of complaints, apart from those of smoke, relating to works not registrable under the Alkali Act have been investigated.

Fumes from gum running and the boiling of linseed oil.—The system of intensive washing by means of sprays has resulted in a considerable reduction of the unpleasant odour resulting from the heating of oil. The odour is, however, not altogether removed and the matter is still receiving attention.

Dust from blast furnaces.—Further progress has been made in the dedusting of blast furnace gas. Dedusting is essential if local nuisance is to be avoided. It is an economic practice and no hardship would be involved were it to be made compulsory.

Fumes from a brass recovery works.—This complaint was due to the emission of zinc oxide from a cupola dealing with the slag produced during the recovery of brass from scrap. In June, an installation was completed which consisted of a series of inverted V-shaped flues followed by a baghouse. The plant has since been in operation and is quite satisfactory.

Fumes from combustion of crude coke oven gas.—Investigation of this complaint showed that combustion on certain gas-fired boilers was incomplete. The waste gases possessed the characteristic odour of raw gas, and tests which were made showed that they contained hydrogen sulphide. The admission of more air was arranged and with a better system of control, the nuisance has been abated.

Emission of lead fumes.—Several complaints that fumes of lead had caused injury to cattle and injurious deposits on vegetation culminated in a serious position at a works in Lancashire where battery residues were smelted, the provision for dedusting the escaping gases being inadequate. There was no lack of evidence as to the emission in this case, and as soon as the matter was brought to the firm's notice, the plant was shut down. Additional dust recovery plant was ordered and its installation is now nearly complete.

Mr. W.A. Damon, Chief Inspector of Alkali etc. Works.

The escape of these and similar gases is such as ought to be brought under preventive control, and it has therefore been decided to secure prevention as far as possible by bringing works which are liable to emit substantial quantities of lead fumes within the scope of the Alkali Act. It is proposed, therefore, to make an Order extending the schedule of registered works by creating a new class designated "Lead Works."

Alkali and Copper (Wet Process) Works

The tonnage of salt decomposed in 1938 was 52,880 tons in the salt cake process and 5,160 tons in the wet copper process. Compared with those of last year, these figures show decreases of 9,870 tons in the salt cake process and 980 tons in the wet copper process.

The average of tests made in 1938 by the staff to determine the escape of hydrochloric acid from this class of work was 0.074 grain per cu. ft., which may be compared with last year's average of 0.077 grain. There has been no case of the statutory limit (0.20 grain HCl per cu. ft.) being exceeded.

As regards cement production works, it has been ascertained that at the end of 1938, 121 rotary kilns in England and Wales were available with a combined capacity of 1,158 tons of cement clinker per hour. There is satisfactory progress to record in the installation of dust arrestment plant.

The proportion of the total capacity produced in kilns fitted with electrical precipitators has gone up from 30.8 per cent. (at end of 1937) to 47.2 per cent. The seven kilns employing washing and the three kilns provided with waste heat boilers are also considered to be satisfactory from a dust emission point of view.

The use of chains is largely economic, but it can also produce a good dust arresting effect. It has been remarked before in these Reports that there is no hard-and-fast rule for the attainment of correct chaining conditions. Each kiln needs to be studied according to its individual peculiarities, and the nature of the raw materials used, but results have shown that with a suitable arrangement of chains a reduction of dust emission to the order of 0.5 grain per cu. ft. (at 15° C.) can be achieved.

It is appreciated that with existing kilns there are sometimes difficulties apart from the obvious financial ones which prevent the immediate installation of dedusting plant. Such cases are regarded sympathetically, the report points out, but there is no reason whatever why the erection of any new plant should be permitted unless guarantees can be given

that the dust emission will be suitably dealt with. Indeed it is now only on such an understanding that registration will be granted.

The average of escapes from smelting works was 2.23 grains per cu. ft. (expressed as SO_3). This is appreciably lower than last year's figure and compares favourably with that of 1936 (2.35 grains). The low and fluctuating prices of base metals during 1938 made the position of the smelter difficult and uncertain but a certain amount of progress is to be recorded.

Sulphuric Acid Works

The production of sulphuric acid in England and Wales during 1938 was 821,000 tons, calculated as monohydrate. This represents a decrease of 103,000 tons compared with the production in 1937. By the courtesy of the National Sulphuric Acid Association, Ltd., the following details are available:—

	1938 *Per cent.*	1937 *Per cent.*
Proportion of available plant in use	71.6	83.5
Proportion of total made in—		
(*a*) chamber plant	60.3	64.7
(*b*) contact plant	39.7	35.3

Raw materials used as a source of sulphur supply were as follows:—

	Tons
Pyrites and anhydrite	251,900
Sulphur and H_2S	72,100
Spent oxide	132,000
Zinc ores	141,600

The low production has made it easy to operate with an escape within the prescribed limit (4.0 grains (as SO_3) per cu. ft.) and there have been only six infractions noted.

The system of water washing, developed by Chance and Hunt, Ltd., at Oldbury, is in operation at five works and a sixth is contemplated. Last year the failure of the system in one instance was reported. That has since been remedied by securing a more uniform distribution of water over the tower packing. The average escapes at these five works compare well with the average at the remaining sulphuric acid works.

The average of all escapes from contact plants tested was 3.30 grains, a figure very slightly less than last year but yet high compared with that from chamber plants. The proportion of sulphuric acid made in contact plants has again risen showing that the tendency to produce in this way continues.

Proportion of total acid produced in	1933	1934	1935	1936	1937	1938
(*a*) Contact plants ..	31.1	27.7	29.9	33.5	35.3	39.7
(*b*) Chamber plants ..	68.9	72.3	70.1	66.5	64.7	60.3

Reasonably good conditions have been maintained in concentration plants, the average escape being 0.54 grain compared with 0.70 grain last year.

The average escape of acid gas (0.057 grain per cu. ft., expressed as the SO_3 equivalent of hydrofluosilicic acid) from chemical manure works was substantially the same as for the previous year. Where new scrubbing plant is contemplated, the importance should be realised of early cooling and wetting of gases followed by an adequate delay period to allow time for the decomposition of silicon tetrafluoride to be completed.

Gas Liquor Works

The production of concentrated gas liquor continues to rise as was to be expected in view of the tendency to centralise production of sulphate and to utilise concentrated liquor for the purpose, thus substantially reducing carriage costs. The number of gas liquor plants registered at the end of 1938 was 111, against 103 at the end of 1937, but not all of these exist for purposes of concentration. Coke ovens have produced less sulphate and this has sometimes led to difficulties in working the saturators owing to the reduced gas flow. On the other hand, the better price prevailing and the elimination of small and uneconomic plants has meant the possibility of a modest profit for the majority of manufacturers if working costs are carefully watched. Considerable attention has been paid to the production of larger crystals and some success in this direction has been attained.

The methods employed for condensation of arsenious oxide evolved during the calcination of tin concentrates remain unchanged. Flues and washers have been maintained in good order and the average of tests made on the escaping gases showed 0.026 grain As_2O_3 with a total acidity of 0.57 grain. The returns for white arsenic and arsenical soot in Cornwall in 1937 were only 95 tons compared with 579 tons in 1930 and 3,207 tons in 1924.

The conditions accompanying manufacture of carbon bisulphide have improved but the possibilities are by no means yet exhausted. The "dropping" of retorts into open barrows with subsequent quenching causes much fume and an enclosed receptacle has recently been devised for the purpose which should render the operation much less offensive. Redistillation of carbon bisulphide has also been the cause of offensive smell on occasions when steaming has been unduly heavy and the seals have in consequence been blown. A thermo-recorder would be a useful aid to control of the temperature and it is hoped that some such instrument will be given a trial.

National Register

Would be Ready in Two Weeks after Outbreak of War

PREPARATIONS for a National Register, which would be complete within two weeks after a state of emergency had arisen, have been made in accordance with the decision announced by the Lord Privy Seal in the House of Commons on December 1 last year. The Register would, however, be brought into operation *in the event of war only*.

The initial compilation has been planned on census lines and will enable details to be obtained of every man, woman and child in the country. The executive arrangements have been made to serve a dual purpose, viz., the compilation of a National Register if an emergency arises, or, if no emergency arises, the taking of the 1941 census.

As Census procedure requires, the whole country has had to be subdivided into enumeration districts, each district being separately planned with specified boundaries and specified street and house contents. To facilitate enumeration in an emergency the standard of size has been reduced. The total number of enumeration districts in Great Britain so planned amount to over 65,000 as compared with the 49,000 of the last census. This work was carried out by local registrars. These officers will supervise the initial compilation of the National Register. All schedules, forms, books and instructions necessary for the initial compilation have been printed and either stored or distributed to these officers, as thought desirable. They have in turn supplied to their enumerators the documents necessary to prepare them for action in an emergency.

When collecting the return from each household, the enumerator will write and issue an identity card for each member of the household, bearing the name and a serial number. This number relates each individual to the household in which he or she was originally registered, and thus to the address and area of registration, and links each individual to his or her recorded particulars. The card will require to be produced for all purposes relevant to the maintenance of the Register, or otherwise on demand by persons authorised to inspect it. The card will be used in connection with food rationing. It will also give details of whether the owner is a member of the armed forces or a civil defence unit.

The scheme will provide a comprehensive system of identity registration which has been framed to meet, so far as possible, all the needs and contingencies of war conditions. The Register will provide statistics of the numbers, sex, age and occupations of the people, to take the place of census statistics as a basis of war administration. The Ministry of Labour will have, it is understood, full access to the Register in order to assist in the compilation of lists of skilled and unskilled labour available to industry.

PERSONAL NOTES

MR. GORDON THOMSON, B.Sc., Ph.D., has been appointed to the research staff of the Calico Printers' Association, Ltd., Manchester.

* * * *

DR. J. H. BURGOYNE has been appointed for one year to the Gas Light and Coke Co.'s Gas Research Fellowship at the Imperial College of Science and Technology. He succeeds Mr. B. Raistrick who, on September 1, completes his Fellowship.

* * * *

MR. H. J. MITCHELL, president of I.C.I., Ltd., was presented with his portrait, painted by Mr. Harold Knight, R.A., by the chairman, Lord McGowan, at a recent board meeting of the company. Lord McGowan, in making the gift, paid tribute to Mr. Mitchell's services to I.C.I. during a period of nearly 45 years.

MR. ARTHUR C. VALLANCE, founder of A. C. Vallance, Ltd., manufacturing chemists, has left estate valued at £31,470 (net personalty, £6,279).

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MR. HENRY PETERS, former senior partner of Peters Brothers, Wouldham, cement manufacturers, has left estate valued at £22,398 (net personalty £18,126).

* * * *

MR. M. WILKINSON, chairman of Central Provinces Manganese Ore Co. and United Kingdom Ferro-Manganese Co., has left estate of the value of £47,049 (net personalty, £42,398).

OBITUARY

MR. JAMES BAIRD, late of the Glasgow firm of Hunter and Warren, Ltd., explosives merchants, died recently, aged 75.

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MR. SIDNEY RAYMOND MAW, a director of Johnson and Sons (Manufacturing Chemists), Ltd., died recently, aged 67.

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MR. GEORGE PEPLER NORTON, chairman of Yorkshire Copper Works, Ltd., Leeds, and a former director of the British Dyestuffs Corporation, Ltd., died recently at the age of 81.

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MR. JOHN EDGAR HAY, a partner in the firm of Colin Hay and Co., oil refiners, Barrack Street, Glasgow, died in hospital at Bordeaux, France, on August 9. Mr. Hay was a well-known figure in business circles in Glasgow and the West of Scotland.

The late Mr. J. E. Hay.

MR. JAMES HINDE, process superintendent at the Burntisland works of the British Aluminium Co., died suddenly at his home at Burntisland, recently, aged 60. He had been with the firm since they started at Burntisland in 1915.

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MR. WILLIAM SKINNER, director of the firm of Thomson, Skinner and Hamilton, scientific instrument merchants, Glasgow, died on August 12, aged 65. A native of Glasgow, he trained as an analytical chemist with Messrs. Tatlock and Thomson, Glasgow, and was appointed chemist with the Burmah Oil Company. For a number of years he was an assayer with mining companies in the South African coalfields, and later was in California as a chemist in connection with copper ores. Returning to Glasgow 34 years ago he with others founded the firm of Thomson, Skinner and Hamilton. He was the sole surviving member of the original founders of the firm. Mr. Skinner was a member of the Society of Chemical Industry for many years.

Recent Trade Literature

THE AUTOMATIC COIL WINDER AND ELECTRICAL EQUIPMENT CO., LTD., have issued a folder dealing with their new Model 40 Universal AvoMeter which replaces the 36-range Universal AvoMeter. This instrument is a new addition to the range of "Avo" electrical measuring instruments and its main differences and modifications are: increased number of ranges, the protective cut-out instead of the fuse, three ohms ranges with internal batteries and a fourth using either A.C. or D.C. mains, all having voltage adjustment.

HEAD, WRIGHTSON AND CO., LTD., have published a folder illustrating some of their installations. Among them are roasting kilns at the Stanton Iron Works Co., Ltd., Nottingham, pig-iron casting machine for production of pigs, a 60 ton hot metal transporting ladle and carriage and a 42 in. hot blast valve.

Incandescent mechanical charging equipment are featured in three leaflets recently issued by the INCANDESCENT HEAT CO., LTD. Arranged for both hand and electric operation, mechanical chargers are applied to batch heat treatment practice to eliminate manual manipulation of cumbersome loads and obtain semi-continuous operation. The leaflets illustrate and describe furnace charging machines of various types.

HADFIELDS, LTD., have issued a folder dealing with chemical plant and autoclaves for high temperatures and pressures. It is stated that concurrent development in the field of high grade alloy steels has assisted in the advances which have been made in the use of high pressures and temperatures in the manufacture of many industrially important chemical products by placing new materials with desirable physical and chemical properties at the disposal of the chemical engineer. Many high pressure processes demand steels with exceptional strength at elevated temperatures as well as considerable resistance to penetration by gases, and to corrosion. Hadfields claim to specialise in this class of plant. The autoclaves they manufacture range from ½ to 20 litres in capacity.

References to Current Literature

Inorganic

Reaction between ammonia and nitric oxide on a platinum surface. Michaelova, *Acta Physicochim. U.R.S.S., 10,* 653-676.

Formation of cyanides in the nitrogenation of calcium carbide. Franck and Kendler, *Z. Elektrochem., 45,* 541-548.

Organic

Allyl methyl carbinol. Stöhr, *Ber., 72,* 1,138-1,139.

Hydrocarbons of the cyclopentane series. Suida and Gemassmer, *Ber., 72,* 1,168-1,173.

Trifluo-acetates. Swarts, *Bull. Soc. Chim. Belg., 48,* 176-191.

Beryllium chloride in organic chemistry. Bredereck, Lehmann, Fritsche and Schönfeld, *Angew. Chem., 52,* 445-446.

Mono- and di-esters of pyrogallol. Wacek and Travnicek, *Osterreichische Chem. Ztg., 42,* 281-286.

Reaction of hexanitro diphenylamine with nitrogen compounds. Langhan, *Nitrocellulose, 10,* 103-105.

Chemistry of the furfural derivatives. Faber, *Seifensieder Ztg., 66,* 534-535, 554-555.

Effect of non-electrolytes on the setting of gelatin gels. Friedman and Shearer, *J. Amer. Chem. Soc., 61,* 1,749-1751.

Structure of proteins. Pauling and Niemann, *J. Amer. Chem. Soc., 61,* 1,860-1,867.

Analysis

Determination of titanium in its ores and in ferro-titanium. Winterstein, *Z. analyt. Chem., 117,* 81-90.

Determination of formaldehyde. Foschini and Talenti, *Z. analyt. Chem., 117,* 94-99.

Precipitation of tin from alkaline solutions. Krokowski, *Z. analyt. Chem., 117,* 105-108.

Molecular weight determination by the freezing point depression method. Prahl, *Angew. Chem., 52,* 481-484.

Colorimetric determination of fluorine. Fahey, *Ind. Eng. Chem. analyt. ed., 11,* 362-363.

Photometric determination of carbon dioxide. Winzler and Baumberger, *Ind. Eng. Chem. analyt. ed., 11,* 371-375.

Conductivity method for leather analysis. Shuttleworth, *J. Intern. Soc. Leather Trades' Chem., 23,* 324-337.

Mineral Oils, Gas, Tar

Physical and chemical properties of petroleum fractions. Rall and Smith, *Ind. Eng. Chem. analyt. ed., 11,* 387-390.

Aromatisation of heptane on chromic oxide. Goldwasser and Taylor, *J. Amer. Chem. Soc., 61,* 1,766-1,769.

Removal of benzol from gas using washing oil. Koopmans, *Gas u. Wasserfach, 82,* 509-515.

Production of hydrocarbons. Held, *Petroleum Z., 35,* 493-495.

Properties of mineral waxes. Casimir and Creangaff, *Petroleum Z., 35,* 511-517.

Manufacture of knockless petrols from straight run benzines. Coulthurst and Umlauf, *Petroleum Z., 35,* 545-546.

Laboratory testing of the ageing of lubricating oils. Jostes and Hann, *Oel u. Kohle, 15,* 515-518, 533-537.

Inflammation of hydrocarbon-air mixtures. Townend and Maccormac, *J. Inst. Petroleum, 25,* 459-486.

Cellulose, Paper

Cellulosic products for use in electric practice. Burmeister, *Zellstoff u. Papier, 19,* 412-415.

Chemical losses and their recovery in the soda process. *Paper Trade J., 109,* No. 1, 34-36.

Physical characteristics of sulphite pitch. Ragan and Kress, *Paper Trade J., 109,* No. 2, 35-37.

Bleaching, Dyeing, Finishing

Theory of the dyeing of regenerated cellulose artificial silk. Baffroy, *Teintex, 4,* 396-403.

Dyeing and finishing of cellulose acetate articles. Bonnet, *Teintex, 4,* 420-424.

Deposition of rubber on to textile fibres. Blow, *J. Soc. Dyers Colorists, 55,* 337-344.

Dyeing properties of animalised fibres and casein wool. Grundy, *J. Soc. Dyers Colorists, 55,* 345-350.

Air conditioning in the manufacture of artificial silk. Schmidt, *Zellwolle, 5,* 190-192.

Iso-electric wool scouring. Elöd, *Melliand Textilber., 20,* 569-570.

Glass, Ceramics

Effect of arsenic on the colouring and de-colouring of glass. Springer, *Glashütte, 69,* 497-499.

Oxide film between fired ground-coat enamels and iron. Kautz, *J. Amer. Ceram. Soc., 22,* 247-250.

Diffusion of water in clays. Morgan and Hursh, *J. Amer. Ceram. Soc., 22,* 271-278.

Meta-kaolin. Tscheischwili, Büssen and Weyl, *Ber. Deutschen Keram. Ges., 20,* 249-276.

Metals, Electrometallurgy

Lead in acid-resisting plant. Mautius, *Metal Ind., 55,* 125-126.

Electrolytic preparation of pure nickel from its alloys. Monselise, *Helv. Chim. Acta, 22,* 935-937.

Influence of silicon and aluminium on the corrosion resistance of steels in petroleum products. Clark and McCollam, *Refiner, 18,* 287-290.

Anodic oxidation of aluminium. Cuthbertson, *Monthly J. Inst. Metals, 6,* 303-326.

Pearlite and martensite. Allison, *Metal Progress, 36,* 60-64.

Zinc alloys. Burkhardt, *Metallwirtsch., 18,* 515-524.

Fats, Oils, Waxes

Linoleic acid of seed fats. Hilditch and Jasperson, *J. Soc. Chem. Ind., 58,* 233-241.

Heating of oil seeds in the press process. Singer, *Seifensieder Z., 66,* 545-546.

Bleaching of fats and recovery of oil from the bleaching earth. Wittka, *Fette u. Seifen, 46,* 344-345.

Paints, Pigments

Effect of pigment concentration on the gloss of enamels. Pickett, *Fed. Paint Varn. Prod. Clubs Dig.,* No. 187, 310-319.

Aeration test for comparison of thinners. Rubek, *Drugs, Oils, Paints, 54,* 236-237.

Schweinfurter green and similar compounds. Walter, *Farbe u. Lack,* 1939, 281-282.

Berlin blue and its properties. Martell, *Farbe u. Lack,* 1939, 305-306.

Spontaneous combustion of linseed oil in varnish manufacture. Fritz, *Farbe u. Lack,* 1939, 327-328.

Chemistry in the paint and varnish industry. Moore, *Paint Varnish Prod. Manager, 19,* 220-224.

Rubbers, Resins, Plastics

Resin-treated plywood. Stamm and Seborg, *Ind. Eng. Chem., 31,* 897-902.

Properties of rubber: mechanical tests. Yerzley, *Rubber Age (U.S.A.), 45,* 211-214.

Determining flow and rate of hardening of artificial resins. Schwittmann, *Kunststoffe, 29,* 190-192.

Miscellaneous

Enamelled chemical equipment. Andrews, *Chem. Met. Eng., 46,* 406-410.

Gas drying in chemical industry. Quarendon, *Ind. Chem., 15,* 279-286.

General News——From Week to Week

BARKER BROTHERS, LTD., bleachers, Heywood, who have been in business since 1896, have decided to close down because of trade slackness.

OWING to the demand for the British Rubber Publicity Association's publication "Rubber in Chemical Engineering," a reprint has recently been issued. The book deals with the properties and chemical resistance of rubber, rubber linings for tanks and similar equipment, rubber paints, cements, etc.

ACCORDING to a memorandum issued by the Birmingham Bureau of Research on Russian Economic Conditions (Russian Dept., Birmingham University) the largest expansion of production in the projected third Five-Year Plan is assigned to the chemical industry with 137 per cent. increase, to machine building with 129 per cent. and to electric power with 106 per cent.

DETAILS of a proposed amalgamation between the Stanton Ironworks Co., Ltd., and Stewarts and Lloyds, Ltd., were announced last week. It is believed that by amalgamation advantages can be secured by the pooling of resources, and that benefits will be derived in many ways from technical and commercial co-operation. In particular the position in the export market will be strengthened.

UNDER A TREASURY order operative from Tuesday, specified goods are to be admitted into the United Kingdom "free of duty from all sources" while the Anglo-Indian trade agreement continues in force. The goods specified are: Shellac, seed lac, stick lac and other varieties of these lacs, raw jute, myrobalans, rice (broken) and mica slabs and splittings. Hemp of the variety Crotalaria Juncea, not further dressed after scutching or decorticating, and tow of such variety of hemp, are also exempt from duty. The Anglo-Indian trade agreement was signed on March 20.

B. LAPORTE, LTD., LUTON, have acquired the Silverband Barytes Mine, at Low Fell near Long Marton, Westmorland. It is proposed to put the mine in a position to deliver several hundred tons of barytes per week by the early part of next year. The product is required primarily by the company as a raw material, but later, it is hoped to supply additional quantities of high-grade ground barytes to the paint and other industries. The mineral will be delivered from Low Fell by a ropeway, two miles in length, to a plant at Long Marton, where a housing scheme is in hand to provide accommodation for employees of the company.

THE BRITISH DRUG HOUSES, LTD., have published a new edition of the priced catalogue of B.D.H. Laboratory Chemicals and Testing Outfits. Section I has been enlarged by the addition of more than 500 new items, mostly organic compounds, and Section II contains an increased number of reagents and solutions for analytical and clinical purposes. For the first time a sub-section of the catalogue is devoted to culture media. Altogether the catalogue comprises nearly 6,000 separate items. It has been provided with a general index, and the lists of reagents for general and clinical analysis have been rearranged. The new catalogue provides a comprehensive record of the chemical substances which can be obtained for analytical use and for research and other scientific purposes.

THE JUNE FIGURES for the Cornwall and Devon china clay trade show that the improvement registered this year is well maintained to the end of the first six months. Although the export figures have not yet reached the big peak of 1937, they are still on the up-grade. The total production of all classes of clay during the first half of this year amounted to 400,465 tons, an increase of 77,696 tons as compared with the corresponding period of last year. Of this total, 368,959 tons consisted of china clay, while 19,519 tons was china stone and 11,987 tons ball clay. The United States was the biggest individual customer over the six months, taking a total of 43,206 tons. Germany and France took only 15,479 tons and 11,954 tons respectively, both of which were decreased quantities. Exports to British India (17,871 tons), and other British countries (17,652 tons), showed increases. China clay shipments for July continue favourably and totalled 64,340 tons compared with 71,766 tons despatched the previous month of June. Fowey despatched 38,641 tons of china clay, 1,943 tons of china stone and 1,345 tons of ball clay; Par, 10,189 tons of china clay, and Charlestown, 6,582 tons of china clay, and 170 tons of china stone.

RICHMOND AND CHANDLER, LTD., Globe Works, Southall Street, Manchester, 3, have taken over the paint grinding and mixing machinery department from Follows and Bate, Ltd., of Gorton, Manchester.

TO COPE with expanding business, B.E.N. Patents, Ltd., High Wycombe, Bucks, manufacturers of the well-known range of air compressors, paint spraying plant and garage equipment, have this week opened a new service depot and showroom at 92 Tottenham Court Road, London, W.1. (Telephone: MUSeum 9588).

NEW WORKS AND EXTENSIONS.—The Tyne Chemical Co., Ltd., is erecting a new chemical works in South Shields; Continental Laboratories, Ltd., are to erect a new works in Brunel Road, Acton, London; the works of Dixon's White, Ltd., paint and varnish manufacturers, at Old Ford Road, London, E.C.3, are being extended.

A METHOD of darkening the windows of buildings, where in times of emergency curtains would be neither practicable nor desirable, has been developed by the Rhodoid department of May and Baker, Ltd. The development is based on complementary colours, such as red and blue, which, when placed together, stop the passage of light. The material, based on cellulose acetate and tinted pale blue, is fixed permanently to the inside of the windows by means of an easily applied adhesive. If warning of an air raid is received, all that is necessary in any building equipped in this way, is to close the windows and fasten pink tinted covers of the material to the lights.

THE BRIGHTSIDE FOUNDRY AND ENGINEERING CO., Sheffield, has obtained a contract for aluminium rolling-mill plant for delivery to the Aluminium Union's associate, the Australian Aluminium Co. Proprietary, Ltd., Sydney. The plant comprises a two-high breaking down mill with tilting tables and three stands of sheet finishing mill rolls. A 47-acre site has been acquired at Granville, near Sydney, New South Wales, for the establishment of plant to produce aluminium alloy materials for Australia's rapidly growing aircraft industry. Plans are also in hand for a smelting plant to produce aluminium ingots from imported bauxite or bauxite concentrates.

THE CHEMICAL works of The British Drug Houses, Ltd., in Graham Street, London, N.1, were threatened by an outbreak of fire which involved an adjoining factory on Tuesday evening. The walls of the B.D.H. factory were sprayed with water which successfully prevented the flames from spreading, but the factory in which the fire started was destroyed. An official of The British Drug Houses, Ltd., said: "We have our own fire-fighting appliances and our own fire-fighters, who were very quick in taking all necessary precautions. The part of the factory where chemicals are stored was divided from the fire by the width of the canal.

AT THE END OF JULY, the total number of completed factories on the Team Valley Trading Estate was 127, of which 101 were in production, employing 3,009 people. Eleven further factories were under construction for prospective tenants. On the South Wales Trading Estate at Treforest, three tenants took possession of factories during July. At the end of July the total number of completed factories on this estate was 61, of which 56 were occupied, giving employment to 2,383 people. A further 16 factories were under construction for tenants. The Commissioner's total commitments at the end of July, 1939, in respect of all the Special Areas in England and Wales totalled approximately £19,520,000. The total expenditure involved, excluding the capital brought into the Areas by new firms being established on the Trading Estates and elsewhere, was more than £26,000,000.

FIRST FIRES have been lit in the ovens of the new carbonising plant at Hemsworth, Yorkshire, one of the largest of its kind, which is to be one of the main power sources of Britain's first towns gas "grid" constructed in the West Riding by the United Kingdom Gas Corporation. The main function of the Hemsworth plant will be to produce coal-gas of consistent quality and gravity direct from the pit-head for supply through high pressure pipes to the 16 distributing centres which form the key points of the "grid." The initial capacity of the Hemsworth plant will be 5,500,000 cubic feet per day. The Hemsworth carbonising unit will comprise a battery of 28 big silica ovens arranged in parallel series.

Foreign News

OIL-PROSPECTING WORK is being carried out in the Fushin coal basin of Manchuria by the Manchurian Coalmining Company.

THE NORTH CHINA SALT CO. has been formed with a capital of 20-25 million dollars to work the salt fields at Changlu.

EXTENSIVE ASBESTOS DEPOSITS located in the Goellnitz district of Slovakia are to be exploited in the near future.

IN CONNECTION with the proposed establishment of a cellulose factory at Ponteverda (Spain), a study commission has been sent to Germany and Sweden.

OWING to the falling off in demand for hydroquinone, the Union Chimique Belge has decided to discontinue its manufacture.

IT IS REPORTED that the output of mercury in Italy reached 1,166 metric tons during the first half of the present year, against 1,251 tons for the corresponding period in 1938.

A NEW FACTORY, backed by Italian capital, is to be built near Bossanski Novi, Jugo-Slavia, for the manufacture of transpareut cellulose wrappings, tannin, rayon and artificial wool.

NORWEGIAN AND DANISH interests are planning to erect a plant at Frederikshavn in which a new phosphate fertiliser ("Orofosfat") will be manufactured on the basis of recent Norwegian patents.

THE U.S. HOUSE COMMITTEE ON MINES AND MINING has approved a Bill directing the United States Bureau of Mines to carry out research experiments regarding new uses (chemical, etc.), for anthracite.

A SUM of £30,000 has been provided from the Colonial Development Fund for a mineralogical and geological survey in seven areas of Kenya, totalling 16,000 square miles, in most of which traces of minerals have already been reported.

MANGANESE ores from the Kumanovo district of Jugoslavia are to be exploited on a large scale by the La Dalmatienne Co. which has recently brought its experimental work in this field to a successful conclusion.

ALUMINIUM production in Russia is to be increased by the utilisation at the Wolchow works of the nephelite which accumulates during the concentration of apatite at Kirowsk. The same material is also to be used in the manufacture of cement in an annual output of 280,000 tons.

THE COMPANIA QUIMICA propose erecting a new factory in Argentina for the manufacture of carbon bisulphide. Liquid chlorine and chlorine derivatives, hydrochloric acid and hypochlorite solutions for technical purposes are likely to be made by the firm in the near future.

THE SOC. CHIMIQUE DE LA GRANDE PAROISSE is planning the large-scale production of shale oils and their hydrogenation products from deposits in the Department of Allier. In its annual report the concern announces the formation in Great Britain of the Oil Development Co., Ltd., for the purpose of exploiting processes for the distillation of shale oil.

ACCORDING to the *Farben-Zeitung* the Vaesteraas works of the Svenska Metallverkens, which is the only zinc white factory in Sweden, is to close down. The firm's employees (numbering about 100) will, it is stated, be absorbed by other departments of the company's works. The plant has been manufacturing zinc white since 1931.

THE FIRST "soil science" school in Australia has been opened at the Agricultural Research Institute at Adelaide. Sir David Rivett, opening the school, said that there were large areas Australians did not know how to use adequately. The annual rainfall in a third of the country was under 10 in., and presented a difficult problem, but in another third it was between 10 in. and 20 in., and the soil could be developed by new lines of attack and scientific research.

A STUDY IS BEING MADE in the Imperial Dairy Institute, Bangalore, of the possibilities of using vegetable rennet in making cheese as a result of the growing need for obtaining a suitable and effective substitute for animal rennet. An extract from a kind of berry obtained from North-West Frontier Province, called *withania coagulanas* has been prepared and used in the making of cheddar cheese and soft cheese. The data collected so far have yielded useful information, but more work in the direction of standardising preparations of the vegetable coagulative and the process of making cheese is needed. The study is, therefore, being continued.

JAPANESE CARBON BISULPHIDE PRODUCERS intend to cut down their output owing to the sharp drop in consumption.

THE SOVIET GOVERNMENT is contemplating the publication of a new pharmacopoeia in 1941, the last issue dating back to 1924.

THE FIRST TRADING YEAR of the Soc. de Gaz Industriels of Athens has concluded with a gross profit of 3.6 million drachmas. The company is associated with the French Air Liquide.

INCREASING DEMAND for wood charcoal in Holland, chiefly from the gas mask industry, has led to resumption of pine and oakwood carbonisation in two districts.

DURING THE first half of the year, Italian exports of transparent cellulose wrapping were valued at 2,194,000 lire, against 1,545,000 lire during the same period last year.

HUNGARY'S SULPHUR OUTPUT amounted to 6,114 tons for the first quarter of this year, against 540 tons during the same period last year.

BAUXITE DEPOSITS recently prospected in the Eastern Pyrenees region have been found to reach a thickness of 15 to 20 feet and reserves already located amount to several hundred thousand tons.

AMMOPHOS, an ammonium phosphate fertiliser now in regular production in the Soviet Union, is also recommended as a fireproofing agent for wood and fabrics. Impregnated materials have been found to withstand a temperature of 700° C.

S.A. "SOLERNA" of Milan are to establish two plants for the saccarification of wood in Tuscany and Calabria respectively. The plants will treat about 30,000 tons annually of waste wood to produce ethyl alcohol, yeasts, etc.

IN CONSEQUENCE of the widespread occurrence of the Colorado beetle, French farmers are being supplied free of charge with arsenical preparations while the authorities are bearing part of the cost of spraying equipment.

A FACTORY PLANT for the production of indium from the residues of zinc manufacture is to be erected following the successful conclusion of development work at the Moscow Institute for Rare Metals Research. The same institute has also developed a new process for the production of copper-beryllium alloys.

M. DE MONZIE, French Minister for Public Works, opened an oil well at Saint Gaudens, near Toulouse, on Sunday. After experimental drilling a gusher of hydrocarbonic gas was discovered at this spot on June 20, and it was subsequently decided to begin deep drilling operations.

AN INSECTICIDE containing aluminium chloride is prepared according to Italian Pat. 356,189 by adding spent lime to a concentrated aqueous solution of aluminium chloride. It is particularly effective against aphides and also as an anticryptogamic agent.

WORK on the erection of a sulphuric acid plant in Shanghai, for the Japanese firm, Hitachi Engineering Works, is reported to be almost completed. The plant, which has cost six million yen, will manufacture about 60 tons of sulphuric acid per day. Waste gases from the Hitachi Works' smelting furnaces are the raw materials.

ETHYL ALCOHOL has now been employed successfully as a solvent in the winning of sandalwood oil from sandalwood. A simple method of utilising the ethyl alcohol even for the recovery of oil from oleo-resin after having used the same solvent during the first stage of the winning of the oleo-resin from sandalwood has been worked out by A. Nagaraja Rao by treating the latter with alcohol of suitable concentrations. It has been observed also that the oil obtained by this process is in every way superior to the oil obtained by the methods hitherto employed in the industry.

THE BELGIAN GOVERNMENT has received an application from the Association of Belgian White Lead Manufacturers for the extension to the entire white lead industry of certain agreements voluntarily reached among members of the Association. These voluntary obligations include an agreement not to manufacture or sell under the description "white lead" any products other than those which, in dry state (powdered), combined chemically in the form of lead hydrocarbonate, have a minimum content of 78.4 per cent. of lead calculated in metallic form. According to the office of the American Commercial Attaché, Brussels, a Government decision is not expected for several months.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

VULCANISATION OF RUBBER.—American Cyanamid Co. (United States, Aug. 5, '38.) 22136.

SYNTHETIC METALLIC ENAMELS.—L. Berger & Sons, Ltd. (Sherwin-Williams Co.). 22057.

PRODUCTION OF CELLULOSE DERIVATIVES.—British Celanese, Ltd. (United States, Aug. 2, '38.) 22402.

PREPARATION OF SOFTENED RUBBER.—British Rubber Producers' Research Association. 22153.

MANUFACTURE OF ALLOYS.—British Thomson-Houston Co., Ltd. (United States July 29, '38.) 21981.

ELECTROLYTIC COMPOSITIONS.—British Thomson-Houston Co., Ltd. (United States, July 30, '38.) 22075.

MANUFACTURE OF VAT DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie). 21877.

MANUFACTURE OF CONDENSATION PRODUCTS.—A. Carpmael (I. G. Farbenindustrie). (May 8.) 22009.

MANUFACTURE OF VAT DYESTUFFS OF THE ANTHANTHRONE SERIES. A. Carpmael (I. G. Farbenindustrie). 22215.

MANUFACTURE OF SUBSTITUTED THIOBARBITURIC ACIDS.—H. C. Carrington and Imperial Chemical Industries, Ltd. 22217.

DISAZO DYESTUFFS.—W. H. Cliffe, A. Kershaw, A. H. Knight, and Imperial Chemical Industries, Ltd. 21883.

PRODUCTION OF STARCH.—Corn Products Refining Co. (United States, Aug. 22, '38.) 22270. (United States, July 20.) 22271.

PROCESS FOR GASIFYING FINELY DIVIDED, ETC., FUELS.—Demag Akt.-Ges. (Germany, Aug. 17, '38.) 22109, 22110.

STRUCTURAL PARTS MADE FROM HEAT-RESISTANT CHROMIUM-NICKEL STEEL ALLOYS.—Deutsche Edelstahlwerke Akt.-Ges. (Germany, Aug. 18, '38.) 22311.

HEAT-RESISTANT STRUCTURAL PARTS PRODUCED FROM A STEEL ALLOY. Deutsche Edelstahlwerke A.-G. (Germany, Aug. 19, '38.) 22312.

PRODUCTION OF BERYLLIUM.—Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler. (Germany, Aug. 3, '38.) 22007.

MANUFACTURE OF CAPILLARY ACTIVE SUBSTANCES.—Deutsche Hydrierwerke A.-G. (Germany, Aug. 3, '38.) 22303.

COATING, ETC., COMPOSITIONS.—Dewey and Almy, Ltd. (United States, Aug. 3, '38.) 22221.

EXPLOSIVE COMPOSITIONS.—E. I. du Pont de Nemours & Co. and C. O. Davis. 21885.

MANUFACTURE OF ANTHRAQUINONE COMPOUNDS.—E. I. du Pont de Nemours & Co., H. R. Lee and D. X. Klein. 22467.

MEANS FOR DAMPING SILICON DUST, ETC.—D. J. Evans. 22358.

MANIPULATING SYNTHETIC PLASTICS.—S. J. Everett. 21917.

MANUFACTURE OF PURE COMPOUNDS OF THE CYCLOPENTANOPOLYHYDROPHENANTHRENE SERIES.—H. Fairbrother (Naamlooze Vennootschap Organon). 22011.

PROCESS FOR CARRYING OUT CATALYTIC REACTIONS, ETC.—J. G. Fife (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). 22006.

APPARATUS FOR USE IN THE DISTILLATION OF CARBONACEOUS MATERIALS at elevated temperatures.—Gas Chambers and Coke Ovens, Ltd., and A. H. Lynn. 22028.

MANUFACTURE OF 1-CHLOROMETHYL-2-HYDROXY-NAPHTHALENE-3-CARBOXYLIC ACID ARYLIDES.—W. W. Groves (I. G. Farbenindustrie.) 21967.

MANUFACTURE OF CHLOROMETHYL-HYDROXY-NAPHTHALENE-DERIVATIVES.—W. W. Groves (I. G. Farbenindustrie). 22162.

TREATMENT OF TEXTILE FABRICS.—Hercules Powder Co. (United States, Aug. 5, '38.) 22185. (United States, June 23.) 22186.

PLASTIC MOULDING MATERIALS.—J. A. Hetherington, F. B. Makin, and B.X. Plastics, Ltd. 22440.

OVENS FOR PRODUCING COKE AND GAS.—P. Hillgenstock. (Germany, Aug. 18, '38.) 22208. (Germany, July 15.) 22209.

TREATMENT OF TEXTILES, ETC.—F. B. Hill, M. W. Alford, and T. Jackson. 22142.

MANUFACTURE OF CLAY PRODUCTS.—F. B. Hobart. 21973.

MANUFACTURE OF PHOSPHORIC ACID DICHLORIDES OF COMPOUNDS having a bactericidal action.—F. Hoffman-La Roche and Co., A.-G. (Germany, July 30, '38.) 21832.

MANUFACTURE OF ESTERS OF TOCOPHEROLS.—F. Hoffmann-La Roche and Co. A.-G. (Switzerland, Aug. 10, '38.) 21833.

METHODS FOR CONTROLLING CHEMICAL PROCESSES.—C. Horrex, O. H. Walters, R. C. Cooper and Imperial Chemical Industries, Ltd. 21884.

CLEANSING, ETC., GASES IN THE MANUFACTURE OF WATER GAS.—Humphreys and Glasgow, Ltd., and J. H. Smith. 22158.

MANUFACTURE OF 3-ARYL-AMINOTETRAHYDROFURANES.—I. G. Farbenindustrie. (Germany, Sept. 19, '38.) 21841.

MANUFACTURE OF CONDENSATION PRODUCTS.—I. G. Farbenindustrie). (Germany, Aug. 1, '38.) 22010.

PROCESS OF HEAT-TREATING METALS, ETC.—I. G. Farbenindustrie. (Germany, Sept. 2, '38.) 22029.

MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. (Germany, Aug. 9, '38.) 22310.

MANUFACTURE OF HEXA-ESTERS OF TETRAPHOSPHORIC ACID.—I. G. Farbenindustrie. (Germany, Aug. 3, '38.) 22436.

TREATMENT OF LIQUID ZINC AMALGAMS.—I. G. Farbenindustrie and Duisburger Kupferhütte. (Germany, Sept. 21, '38.) 22437.

MANUFACTURE OF CELLULAR PRODUCTS.—L. Mellersh-Jackson (Berry and Co., Inc.). 22184.

METHODS FOR THE PURIFICATION OF CELLULOSE ETHERS.—L. Mellersh-Jackson (Hercules Powder Co.). 22024.

PROCESS FOR PURIFICATION OF WATER.—J. Krüger. (Denmark, Aug. 1, '38.) 22149. (Denmark, Nov. 12, '38.) 22150.

SMELTING OF IRON ORES containing titanium oxide.—F. Krupp A.-G. (Germany, Aug. 6, '38.) 22316.

TREATMENT OF JUTE, ETC.—B. Laporte, Ltd., and I. E. Weber. 21971.

MANUFACTURE OF SUBSTITUTED BARBITURIC ACIDS.—E. Lilly and Co. (United States, July 30, '38.) 22022.

RECOVERY OF IRON FROM IRON-CONTAINING MATERIALS.—M. McGuinness. 22015.

ARTIFICIAL TEXTILE FIBRES, ETC.—C. H. Masland and Sons, Inc. (United States, Jan. 9.) 22145.

MANUFACTURE OF WATER SOLUBLE ORGANIC ARSENIC COMPOUNDS.—May and Baker, Ltd., G. Newbery and A. D. H. Self. 22179.

MANUFACTURE OF PLASTICS.—A. Menzies. 22262.

NICKEL ANODES.—Mond Nickel Co., Ltd. (United States, Aug. 16, '38.) 22014.

METHOD FOR REMOVING ZINC FROM LEAD, ETC.—National Lead Co. (United States, Nov. 10, '38.) 22198.

PROCESS FOR THE RECOVERY OF POTASSIUM SALTS FROM SOLUTIONS. Norsk Hydro-Elektrisk Kvaelstof-Aktieselskab. (Norway, July 29, '38.) 22025. (Norway, May 10.) 22026. (Norway, May 25.) 22027.

PURIFICATION OF ELECTROLYTE SOLUTIONS, ETC.—Ocean Salts (Products), Ltd. and B. A. Adams. 21847.

WASHING OF PRECIPITATED MAGNESIUM HYDROXIDE.—Ocean Salts (Products), Ltd., and B. A. Adams. 21848.

READILY-FUSIBLE GLASSES FREE FROM SILICON.—Hermes Patentverwertungs-Ges. (Germany, July 28, '38.) 22003.

INORGANIC PROTECTIVE MATERIALS, ETC.—Hermes Patentverwertungs-Ges. (Germany, July 28, '38.) 22004.

ELECTROLYTIC PRODUCTION OF LEAD HYDROXIDE.—Priestman Collieries, Ltd., and T. G. French. 22207.

METHODS OF COMMINUTING ANIMAL, ETC., SUBSTANCES into a colloidal, etc., state.—P. Reichert. 22227.

LUBRICANT COMPOSITIONS.—A. J. Rudge, C. I. Snow, and Imperial Chemical Industries, Ltd. 22466.

MANUFACTURE OF GLUED COMPOUND PLATES.—Soc. of Chemical Industry in Basle. (Switzerland, July 30, '38.) 21970.

MANUFACTURE OF BASIC ESTERS.—Soc. of Chemical Industry in Basle. (Switzerland, Aug. 5, '38.) 22277. (Switzerland, June 20). 22278.

MANUFACTURE OF BASIC ESTERS AND AMIDES OF ALICYCLIC AND ARYL-ALICYCLIC FATTY ACIDS.—Soc. of Chemical Industry in Basle. (Switzerland, Aug. 5, '38.) 22279. (Switzerland, June 20.) 22280.

MANUFACTURE OF CONDENSATION PRODUCTS.—Soc. of Chemical Industry in Basle. (Switzerland, Aug. 11, '38.) 22395. (Switzerland, July 19.) 22396.

MANUFACTURE OF ASYMMETRICAL CONDENSATION PRODUCTS.—Soc. of Chemical Industry in Basle (Switzerland, Aug. 12, '38.) 22397. (Switzerland, July 20.) 22398.

MANUFACTURE OF CONDENSATION PRODUCTS.—Soc. of Chemical Industry in Basle. (Switzerland, Aug. 13, '38.) 22399. (Switzerland, July 21.) 22400.

PRODUCTION OF MOULDED CERAMIC PRODUCTS.—Thermal Syndicate, Ltd., and R. B. Miller. 22252.

DYESTUFF INTERMEDIATES.—M. Wyler and Imperial Chemical Industries, Ltd. 22218.

Complete Specifications Open to Public Inspection

ALLOYS.—Baker and Co., Inc. Jan. 29, 1938. 22749/38.

SETTING FILMS OF COATING COMPOSITIONS containing a urea formaldehyde resin.—Interchemical Corporation. Jan. 29, 1938. 37515/38.

PRODUCTION AND USE OF SOLUTIONS of high-molecular weight sulphur-containing condensation products.—Rutgerswerke A.-G. Jan. 25, 1938. 1787/39.

PLASTIC COMPOSITION.—C. P. Winslow. Jan. 28, 1938. 2056/39.

MANUFACTURE OF SULPHONIC ACIDS.—I. G. Farbenindustrie. Jan. 25, 1938. 2507/39.

COLOURATION OF ARTIFICIAL MATERIALS.—British Celanese, Ltd. Jan. 26, 1938. 2593/39.

MANUFACTURE OF MODIFIED POLYMERISED ESTERS of methacrylic acid.—E. I. du Pont de Nemours and Co. Jan. 26, 1938. 2621/39.

PROCESS FOR THE MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. Jan. 25, 1938. 2657/39.

RECLAIMING RUBBER.—I. G. Farbenindustrie. Jan. 29, 1938. 2779/39.

QUININE SOLUTIONS.—Naamlooze Vennootschap Orgachemia. Jan. 28, 1938. 2888/39.

SEPARATION OF LACTOFLAVIN and its phosphoric acid esters.—Naamlooze Vennootschap Organon. Jan. 28, 1938. 2889/39.

MANUFACTURE AND PRODUCTION OF CAPILLARY ACTIVE SUBSTANCES. I. G. Farbenindustrie. Jan. 27, 1938. 2900/39.

MANUFACTURE OF SYNTHETIC RESINS.—Norton Grinding Wheel Co., Ltd. Jan. 28, 1938. 2914-6/39.

MANUFACTURE OF ABRASIVE ARTICLES.—Norton Grinding Wheel Co., Ltd. Jan. 28, 1938. 2917/39.

PRODUCING MELAMINE.—I. G. Farbenindustrie. Jan. 29, 1938. 2941/39.

MANUFACTURING OF WET-STRENGTHENED PAPER PRODUCTS.—Brown Co. Jan. 28, 1938. 2992/39.

MANUFACTURE OF BENZENESULPHAMIDO DERIVATIVES.—Soc. of Chemical Industry in Basle. Jan. 31, 1938. 3109/39.

POWDERED CELLULOSE and method of preparing same.—J. Kent. Jan. 31, 1938. 3151/39.

TETRASULPHONIC ACID ESTERS OF INDANTHRONES.—I. G. Farbenindustrie. Jan. 31, 1938. 3155/39.

PROCESS FOR THE MANUFACTURE OF ARTIFICIAL TANNING AGENTS and products resulting from them. Jan. 31, 1938. 3159/39.

MANUFACTURE OF PERMANENT MAGNET ALLOYS.—F. Krupp A.-G. Jan. 28, 1938. 3161/39.

APPARATUS FOR THE POLYMERISATION OF NORMALLY GASEOUS OLEFINES and/or the hydrogenation of olefinic polymers to form motor fuel hydrocarbons.—Universal Oil Products Co. Aug. 23, 1937. 21649/39.

Specifications Accepted with Date of Application

MOULDING BITUMINOUS and other thermoplastic compositions.—Richardson Co. Sept. 1, 1938. 509,570.

PRODUCING CELLULOSE WOOL with wool-like crimping from viscose.—Vereinigte Glanzstoff-Fabriken, A.-G. Nov. 23, 1937. 509,572.

ELECTRO-GALVANISING PROCESS for depositing zinc coatings.—J. P. Hubbell, and L. Weisberg. Dec. 1, 1937. 509,577.

MANUFACTURE OF AZO-DYESTUFFS.—J. R. Geigy, A.-G. Dec. 29, 1937. 509,581.

PREPARATION OF CELLULOSE DERIVATIVES.—W. J. Tennant (Dow Chemical Co.). Feb. 13, 1939. 509,689.

CONVERSION OF MINERAL OILS INTO GASOLINE.—A. H. Stevens (Standard Oil Co. (Indiana)). Nov. 26, 1937. 510,155.

MANUFACTURE OF DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie). Dec. 20, 1937. 509,927.

METHODS OF PRODUCING STABLE COPPER HYDROXIDE.—New Process Rayon, Inc. Jan. 26, 1937. 510,082.

TREATING CELLULOSIC MATERIALS.—Tootal Broadbent Lee Co., Ltd., J. Bancroft, R. P. Foulds, and W. H. Roscoe. Jan. 21, 1938. 510,083.

MANUFACTURE OF 5 : 6 : 7 : 8-TETRAHYDROANTHRAQUINONE DERIVATIVES containing nitrogen, and of leuco-5 : 6 : 7 : 8-tetrahydroquinizarin.—W. W. Groves (I. G. Farbenindustrie). Jan. 25, 1938. 510,010.

MANUFACTURE OF SUBSTANCES OF CAPILLARY ACTION.—W. W. Groves (I. G. Farbenindustrie). Jan. 25, 1938. 510,318.

HEAT-RESISTANT ALLOYS.—Heraeus-Vacuumschmelze A.-G. March 4, 1937. 510,236.

MANUFACTURE OF AZO DYESTUFF DERIVATIVES.—Soc. of Chemical Industry in Basle. Jan. 26, 1937. 510,091.

SEPARATION OF MIXTURES OF OILS WITH SOLID SUBSTANCES.—G. W. Johnson (I. G. Farbenindustrie). Jan. 26, 1938. 510,018.

GRANULATION OF METALS, alloys, and other fusible materials.—Deutsche Gold-und Silber Scheideanstalt Vorm. Roessler, and W. Truthe. Jan. 26, 1938. 510,320.

MANUFACTURE OF CELLULOSE.—H. Dreyfus. Jan. 27, 1938. 510,165.

MANUFACTURE OF 3-HYDROXY-4-CARBAMINOBENZENE-1-ARSONIC ACID. W. W. Groves (I. G. Farbenindustrie.) Jan. 27, 1938. 510,167.

MANUFACTURE OF POLYMERIC COMPOUNDS.—W. W. Groves (I. G. Farbenindustrie.) Jan. 27, 1938. 510,168.

MANUFACTURE AND PRODUCTION OF NITROGENOUS CONDENSATION PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) Jan. 27, 1938. 510,321.

LUBRICATING-COMPOSITIONS.—C. Arnold (Lubri-Zol Corporation). Jan. 27, 1938. 510,173.

MANUFACTURE OF POLYMETHINE DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) Jan. 28, 1938. 510,242.

MANUFACTURE OF ION EXCHANGE BODIES.—I. G Farbenindustrie. Feb. 6, 1937. 510,243.

LUBRICATING-OILS.—W. Helmore. Jan. 28, 1938. 510,244.

MANUFACTURE OF CELLULOSE.—H. Dreyfus. Jan. 29, 1938. 509,938.

STILBENE DERIVATIVES.—May and Baker, Ltd., A. J. Ewins, and J. N. Ashley. Feb. 1, 1938. 510,097.

TREATMENT OF RARE-EARTH MINERALS.—A. R. Powell, and Johnson, Matthey and Co., Ltd. Feb. 18, 1938. 510,198.

PROCESS FOR THE MANUFACTURE and production of cellulosic textile materials.—Courtaulds, Ltd., and J. Boulton. Feb. 28, 1938. 510,199.

DEWATERING OF MATERIALS, especially cellulose and the like, on a rotary sieve cylinder.—J. Strindlund. April 25, 1938. 510,034.

CATALYSTS FOR USE IN CRACKING HYDROCARBONS.—Standard Oil Development Co. Oct. 22, 1937. 510,110.

CRYSTALLISATION OF ALKALINE-EARTH METAL NITRATES.—Azogeno Soc. Anon., and C. Toniolo. Aug. 4, 1937. 510,053.

PREPARATION OF STABLE AND INJECTABLE ORGANIC CALCIUM SALT SOLUTIONS.—G. A. R. von Wulfing, and E. H. H. Rosskothen (trading as J. A. Wulfing). Aug. 6, 1937. 510,118.

METHOD FOR THE PRODUCTION OF OXALIC ACID by the oxidation of carbohydrates with nitric acid.—Zjednoczone fabryki Zwiazkow Azotowych W Moscicach IW Chorzowie. Sept. 8, 1937. 510,057.

MANUFACTURE OF ACID *o*-HYDROXYDISAZO DYESTUFFS, capable of being after-chromed.—J. R. Geigy, A.-G. Sept. 7, 1937. 510,058.

MANUFACTURE OF ORGANIC MERCURY COMPOUNDS.—Fahlberg-List, A.-G. Chemische Fabriken. Sept. 17, 1937. 510,063.

CONTINUOUS DISTILLATION OF CELLULOSIC MATERIAL and apparatus for carrying out this process.—G. A. L. Hennebutte, H. G. Hennebutte, G. B. Hennebutte, and P. P. Hennebutte. Oct. 5, 1938. 509,966.

PRODUCTION OF ARSENATES.—J. B. Stalhane. Oct. 22, 1938. 509,971.

REDUCTION OF IRON ORES or copper ores in rotary furnaces.—Sachtleben, A.-G. Fur Bergbau und Chemische Industrie. Oct. 6, 1937. 510,337.

METHOD AND APPARATUS FOR INJECTION MOULDING THERMOPLASTIC MATERIAL such as vinyl resins.—Carbide and Carbon Chemicals Corporation. Nov. 11, 1937. 510,219.

PROCESS FOR THE MANUFACTURE OF p-p^1-DIAMINO-DIPHENYL-SULPHONE and its monoacyl derivatives.—Schering, A.-G. Nov. 1, 1937. 510,127.

PRODUCTION OF CONSISTENT LUBRICATING GREASES.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Nov. 22, 1937. 509,976.

TREATMENT OF MIXTURES OF UREA, water, carbon dioxide and ammonia, produced in the course of the manufacture of urea.—Compagnie de Produits Chimiques et Electrometallurgiques, Alais, Froges, et Camargue. Jan. 6, 1938. 509,987.

MANUFACTURE OF ACID WOOL DYESTUFFS.—I. G. Farbenindustrie. Dec. 8, 1937. 509,988.

TREATMENT OF ZEIN.—Corn Products Refining Co. Dec. 20, 1937. 509,991.

PROCESS FOR THE MANUFACTURE OF *a*-NAPHTHACETYLAMINO ACIDS. F. Hoffman-La Roche & Co. A.-G. Feb. 2, 1938. 510,138.

MANUFACTURE OF SUBSTANCES OF CAPILLARY ACTION.—W. W. Groves (I. G. Farbenindustrie.) Jan. 25, 1938. 510,308.

MANUFACTURE OF SUBSTANCES OF CAPILLARY ACTION.—W. W. Groves (I. G. Farbenindustrie.) Jan. 25, 1938. 510,309.

MANUFACTURE OF SUBSTANCES OF CAPILLARY ACTION.—W. W. Groves (I. G. Farbenindustrie.) Jan. 25, 1938. 510,310.

MANUFACTURE OF ARTIFICIAL SILK.—Naamlooze Vennootschap Kunstzijdespinnerij Nyma, and H. Van Deinse. Jan. 26, 1939. 510,140.

PROCESS FOR THE MANUFACTURE OF PRODUCTS of vitreous sintered quartz.—F. Skaupy, and G. J. Weissenberg. Dec. 20, 1937. 510,081.

MANUFACTURE OF TEXTILE FIBRES composed of cellulose ethers.—R. Wallach. Nov. 2, 1937. 510,511.

CATALYTIC PRODUCTION OF HYDROCARBONS.—Metallges A.-G. July 17, 1937. 510,351.

CATALYTIC SYNTHESIS OF HYDROCARBONS.—W. H. A. Thiemann (Metallges A.-G.). Dec. 2, 1937. 510,514.

PROTECTION OF MAGNESIUM and magnesium alloys against corrosion.—H. Sutton and L. F. Le Brocq. Dec. 23, 1937. 510,353.

COLOURATION OF CELLULOSE ESTER TEXTILES.—C. S. Bedford, J. G. Bedford and R. C. Storey. Dec. 31, 1937. 510,515.

HALOGENATION OF MATERIALS.—C. G. Fink. Dec. 31, 1937. 510,438.

DYEING OF TEXTILE MATERIALS comprising cellulose or its derivatives.—Courtaulds, Ltd., and T. H. Morton. Jan. 11, 1938. 510,516.

METHOD OF DESULPHURING AND REFINING IRON.—A. Thyssen-Hutte A.-G. April 17, 1937. 510,527.

PREPARATION OF CHLORINE DIOXIDE.—C. H. Evans. Feb. 1, 1938. (Cognate application, 3402/39.) 510,678.

MANUFACTURE OF STYRENE and related compounds.—W. J. Tennant (Dow Chemical Co.). Feb. 1, 1938. 510,450.

PYROLYSIS OF SECONDARY BUTYLBENZENE COMPOUNDS.—W. J. Tennant (Dow Chemical Co.) Feb. 1, 1938. 510,451.

PRODUCTION OF ALUMINATES AND SULPHUR DIOXIDE.—W. W. Groves (I. G. Farbenindustrie). Feb. 2, 1938. 510,536.

MANUFACTURE OF DYESTUFFS of the azo series and of the aminoanthraquinone series.—Soc. of Chemical Industry in Basle. Feb. 3, 1937. (Cognate applications 3255/38 and 3256/38.) 510,453.

CONDENSATION OF CITRAL with other aldehydes.—I. M. Heilbron, W. E. Jones and J. W. Batty. Feb. 2, 1938. 510,540.

MANUFACTURE OF SUBSTITUTED THIOBARBITURIC ACIDS.—H. C. Carrington and Imperial Chemical Industries, Ltd. Feb. 2, 1938. 510,543.

MANUFACTURE AND PRODUCTION OF ORGANIC NITROGENOUS COMPOUNDS.—G. W. Johnson (I. G. Farbenindustrie). Feb. 3, 1938. 510,457.

PROCESS FOR THE MANUFACTURE OF YARNS from vegetable fibres containing adhesive substances.—C. F. Hofmann. Dec. 20, 1937. 510,544.

Company News

Pilgrim Products, Ltd., have increased their nominal capital by the addition of £25,000, beyond the registered capital of £15,000.

W. A. Mitchell and Smith, Ltd., have increased their nominal capital by the addition of £4,000, in £1 ordinary shares, beyond the registered capital of £4,000.

British Oil and Cake Mills, Ltd., have declared an interim dividend of 5 per cent. on cumulative preferred ordinary shares, less tax.

Sternol, Ltd., have declared a dividend of 6 per cent. on 8 per cent. participating preferred ordinary shares on account of arrears to June 30, 1934, payable August 25.

Yardley and Co., Ltd., have declared an interim dividend of 15 per cent. for 1939 (the same).

The Calico Printers' Association report for the year to June 30 a loss of £149,780, compared with one of £93,542 for the previous year. The balance is struck after providing £356,762, against £367,228 for maintenance, depreciation, etc. After transferring £150,000 from reserve the carry-forward is £40,028, against £39,808. In the previous year £50,000 was credited from reserve.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Switzerland.—A well-established agent at Thalwil wishes to obtain the representation for Switzerland (or Eastern part of Switzerland) of United Kingdom manufacturers of machinery and apparatus for the chemical, pharmaceutical, foodstuff and beverage industries and welding electrodes. He prefers to work on a commission basis. (Ref. No. 663.)

A well-established agent at St. Gall wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of leather, steel, non-ferrous metals, tools and oils for the automobile and engineering industries for Switzerland. (Ref. **No. 627.)**

Books Received

Uses and Applications of Chemicals and Related Materials. By Thomas C. Gregory. New York: The Reinhold Publishing Corpn. London: Chapman & Hall, Ltd. Pp. 665. 50s.

A Text Book on Light. By A. W. Barton, M.A., Ph.D. London: Longmans, Green & Co., Ltd. Pp. 426. 8s.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

J. FERRER, LTD., London, E.C., chemical manufacturers. (M., 19/8/39.) Aug. 2. £300 debenture to H. Furman, Stamford Hill; general charge. *—. June 15, 1939.

RICHARD THOMAS AND CO., LTD., London, W.C., tinplate manufacturers. (M., 19/8/39.) August 4, substituted security, supplemental to Trust Deeds dated June 30, 1937, and July 29, 1938; charged on various freehold and leasehold properties, certain shares, etc.; also August 8, £308,000 4½ per cent. redeemable prior lien debenture stock part of an amount already registered. *£8,620,410. August 11, 1938.

Satisfactions

LONDON SOAP AND CHEMICAL CO., LTD. (formerly Lyptol (London), Ltd.). (M.S., 19/8/39.) Satisfaction July 31, of debenture registered July 1, 1932.

LONDON ALUMINIUM CO., LTD., Birmingham. (M.S., 19/8/39.) Satisfactions August 4, of debentures registered October 14, October 29 and December 1, 1904, and £3,350, registered August 21, 1915.

Companies Winding-up Voluntarily

CHEMICAL REACTIONS, LTD. (C.W.U.V., 19/8/39.) August 4, J. Smith, 19 The Mount, New Malden, liquidator.

New Companies Registered

London Pharmaceutical Laboratories, Ltd.—355,297. Private company. Capital, £1,000 in 1,000 shares of £1 each. To carry on business as manufacturers of and dealers in chemicals, gases, drugs, medicines, etc. Subscribers: P. F. Money, 3-4 Clements Inn, W.C.2; Elsie Shaw.

Chemical and Allied Stocks and Shares

PENDING easing of tension in European politics the volume of business in the industrial and other sections of the Stock Exchange has remained at a low ebb. Nevertheless the undertone appeared to be steadier, and despite moderate fluctuations, share values were little changed on balance for the week.

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Imperial Chemical attracted attention and were 30s. 3d. compared with 29s. 1½d. a week ago, while the preference units were firmer at 30s. On the other hand Lever and Unilever were a few pence lower at 33s. 6d. and reduced prices ruled for British Oxygen, Turner and Newall, Distillers and numerous other widely-held shares. British Match were maintained at 34s. 9d. and Swedish Match at 23s. 9d. were also unchanged on balance. Fison Packard at 41s. 3d., B. Laporte at 61s. and British Oil and Cake Mills preferred ordinary at 40s., kept at the same prices as those current a week ago. British Aluminium declined 6d. to 57s., but a better tendency was observable in Metal Box ordinary which were slightly higher at 73s. 9d.

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Triplex Glass reacted to 34s. 6d. on the preliminary figures for the past year's working and the reduction in the dividend from 25 per cent. to 20 per cent. United Glass Bottle were rather more active, but remained around 50s. awaiting declaration of the interim dividend, due early next month. Canning Town Glass, Redfearn Bros., and shares of other glass manufacturing concerns attracted very little attention. General Refractories remained at 7s. 3d. The market does not expect an early return of the last-named company to the dividend list, although it is assumed that profits are running at a better level, because the activity in the iron and steel trades should be leading to expansion in demand for refractories. Imperial Smelting were little changed at 9s. 10½d. awaiting the decision in regard to a distribution on the preference shares, which falls to be made next month. United Molasses reacted, but subsequently rallied and at 24s. 1½d. were well maintained on balance. Dunlop Rubber also fluctuated, but at 28s. 9d. were within a few pence of the price current a week ago.

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British Plaster Board had a firmer appearance at 30s. and Associated Cement were 70s. 7½d., while Tunnel Cement were steadier at 38s. 9d., aided by the maintenance of the interim dividend. Wall Paper deferred were steady at 25s., and International Paint were again 81s. 3d., but Pinchin Johnson, which were affected by doubts whether the interim dividend will be maintained, went back from 22s. 3d. to 21s. 9d. Cellon ordinary shares continued to be quoted at 15s. 6d., British Glues remained rather a more active market at 4s. 9d. and the participating preference shares kept at 24s. 4½d. Newton Chambers were 41s. at Sheffield, compared with 41s. 6d. a week ago.

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Movements in iron and steel securities were moderate. Stewarts and Lloyd's were 43s. 6d., which compared with 44s. 1½d. last week, and Stanton Ironworks declined 6d. to 53s. 3d. Guest Keen improved from 24s. 9d. to 25s. Babcock and Wilcox were little changed at 46s. 9d. Tube Investments had a more active appearance around 90s., it being pointed out that in view of the company's financial interest in, and working agreement with, Stewarts and Lloyd's, it stands to benefit indirectly from the proposed Stewarts and Lloyd's-Stanton Ironworks merger.

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Elsewhere Monsanto Chemicals 5½ per cent. preference kept at 21s. 10½d., while Greeff-Chemicals Holdings ordinary units were 5s. 7½d. William Blythe were again quoted at 6s. and Lawes Chemical at 7s. 6d., while British Tar Products transferred around 6s. 7½d. Boots Drug showed a steady tendency at 43s., as did Sangers at 20s. 6d. and Timothy Whites and Taylors at 22s. 1½d. Beechams Pills deferred remained at 8s. 3d., awaiting the forthcoming interim dividend announcement. News of steps to limit production of oil in the U.S.A. produced a somewhat better tendency in the oil share market, but best prices touched by "Shell" and other "leaders" earlier in the week were not held.

Weekly Prices of British Chemical Products

MODERATELY active conditions prevail in the general chemical market this week, nearly all sections being affected by holiday influences. So far as existing contract commitments are concerned deliveries are maintained on a good scale and the quantities going forward for consumption are substantial. A good seasonal inquiry is circulating for acetic, tartaric and citric acids and acetone is reported to be in good demand. There are no important price changes to record for general chemicals, rubber chemicals and wood distillation products and values are steady with a firm undertone. In the coal tar section business is exceedingly quiet, but the trend of values, if anything, is to higher levels.

MANCHESTER.—The Manchester chemical market during the past week has been by no means free from holiday influences, although the interference with fresh business and also with deliveries under contracts has been less strongly in evidence than it was a week ago. The soda products are being taken up in fair quantities and a moderate movement has also been reported in the case of the leading potash and ammonia compounds, whilst heavy acids are meeting with a fairly steady demand. Little weakness in any section of the market has been reported. Among the by-products, the demand for pitch is quiet still, but a number of the light distillates are being taken up in good quantities at steady prices.

Price Changes

Rises: Ammonium Dichromate; Potassium Chromate; Cadmium Sulphide; Pyridine; Red Lead (Glasgow).

Falls: Carbolic Acid (dehydrated).

GLASGOW.—Business in general chemicals has been rather quieter during the week, both for home trade and export. There have been no further changes in prices, all of which remain very steady at about last week's figures.

General Chemicals

ACETONE.—£39 to £43 per ton, according to quantity.

ACETIC ACID.—Tech., 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech., glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 5s. 0d. per ton d/d Lancs.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE (see Salammoniac).—Firsts, lump, spot, £42 17s. 6d. per ton; d/d address in barrels. Dog-tooth crystals, £35 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

AMMONIUM DICHROMATE.—9½d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £10 10s. per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £15 10s. per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £12 per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 5s. per ton in casks, special terms for contract. GLASGOW: £9 5s. per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16 per ton in 1-cwt. bags. carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CALCIUM CHLORIDE.—GLASGOW: 70/75% solid, £5 12s. 6d. per ton ex store.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 4⅜d. per lb. d/d station in single 70-lb. cylinders.

CHROMETAN.—Crystals, 2⅜d. per lb.; liquor, £13 per ton d/d station in drums.

CHROMIC ACID.—9d. per lb., less 2½%; d/d U.K.

CHROMIC OXIDE.—11½d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0½d. per lb. MANCHESTER: 1s. 0½d. GLASGOW: B.P. crystals, 1s. 0½d. per lb; less 5%, ex store.

COPPER SULPHATE.—£18 5s. per ton, less 2% in bags. MANCHESTER: £18 17s 6d. per ton f.o.b. GLASGOW: £19 10s. per ton, less 5%, Liverpool in casks.

CREAM OF TARTAR.—100%, £4 12s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1,260 s.g., in tins, £3 10s. to £4 10s. per cwt. according to quantity; in drums, £3 2s. 6d. to £3 16s. 0d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 9d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. MANCHESTER: White, £31; brown, £30. GLASGOW: White crystals, £30; brown, £1 per ton less.

LEAD NITRATE.—£27 per ton for 1-ton lots.

LEAD, RED.—£31 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. GLASGOW: £31 per ton, less 2½% carriage paid for 2-ton lots.

LITHARGE.—GLASGOW: Ground, £31 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—Calcined, in bags, ex works, about £8 per ton.

MAGNESIUM CHLORIDE.—Solid (ex wharf) £5 10s. per ton. GLASGOW: £7 5s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY PRODUCTS.—Ammoniated B.P. (white precip.), lump, 6s. 5d. per lb.; powder B.P., 6s. 7d.; bichloride B.P. (corros. sub.), 5s. 8d.; powder B.P., 5s. 1d.; chloride B.P. (calomel), 6s. 2d.; red oxide cryst. (red precip.), 7s. 6d.; levig. 6s. 9d.; yellow oxide B.P. 6s. 10d.; persulphate white B.P.C., 6s. 7d.; sulphide black (hyd. sulph. cum. sulph. 50%), 6s. 6d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. MANCHESTER: £49 to £55 per ton ex store. GLASGOW: £2 9s. per cwt. in casks.

PARAFFIN WAX.—GLASGOW: 3¾d. per lb.

POTASH, CAUSTIC.—Solid, £33 5s. to £38 per ton according to quantity, ex store; broken, £40 per ton. MANCHESTER: £38.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. MANCHESTER: £37 per ton. GLASGOW: 4½d. per lb.

POTASSIUM DICHROMATE.—5½d. per lb. carriage paid. GLASGOW: 5½d. per lb., net, carriage paid.

POTASSIUM CHROMATE.—9d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P. 6s. 3d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity.

POTASSIUM PERMANGANATE.—LONDON: 9½d to 10½d. per lb. MANCHESTER: B.P. 9½d. to 11½d. GLASGOW: B.P. Crystals, 10½d.

POTASSIUM PRUSSIATE.—6d. to 6½d. per lb. MANCHESTER: Yellow, 6d. to 6½d.

PRUSSIATE OF POTASH CRYSTALS.—In casks, 6¾d. per lb. net, ex store.

SALT CAKE.—Unground, spot, £3 8s. 6d. per ton.

SODA ASH.—Light 98/100%, £5 17s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 10s. per ton d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£19-£20 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags in 1-ton lots. MANCHESTER: £10 15s. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags.

SODIUM BISULPHITE POWDER.—60/62%, £12 10s. to £14 per ton d/d in 2-ton lots for home trade.

SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.
SODIUM CHLORATE.—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.
SODIUM DICHROMATE.—Crystals cake and powder 4¼d. per lb. net d/d U.K. with rebates for contracts. GLASGOW: 4¼d. per lb., carriage paid.
SODIUM CHROMATE.—4½d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.
SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags.
SODIUM NITRATE.—Refined, £8 5s. per ton for 6-ton lots d/d. GLASGOW: £1 12s. per cwt. in 1-cwt. kegs, net, ex store.
SODIUM NITRITE.—£18 5s. per ton for ton lots.
SODIUM PERBORATE.—10%, £4 per cwt. d/d in 1-cwt. drums.
SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.
SODIUM PRUSSIATE.—4d. per lb. for ton lots. MANCHESTER: 4¼d. to 5d. GLASGOW: 4d.
SODIUM SILICATE.—£8 2s. 6d. per ton.
SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. MANCHESTER: £3 10s.
SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.
SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.
SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.
TARTARIC ACID.— 1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb. GLASGOW: 1s. 1¼d. per lb., 5%, ex store.
ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2-cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7½d. to 1s. 2½d. per lb., according to quality. Crimson, 1s. 6½d. to 1s. 8d. per lb.
ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.
BARYTES.—£6 to £6 10s. per ton, according to quality.
CADMIUM SULPHIDE.—2s. 11d. to 3s. 2d. per lb.
CARBON BLACK.—3¾d. to 4 1/16d. per lb., ex store.
CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.
CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.
CHROMIUM OXIDE.—Green, 11½d. per lb.
DIPHENYLGUANIDINE.—2s. 2d. per lb.
INDIA-RUBBER SUBSTITUTES.—White, 4½d. to 5d. per lb.; dark 3¾d. to 4¾d. per lb.
LAMP BLACK.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.
LEAD HYPOSULPHITE.—9d. per lb.
LITHOPONE.—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.
SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.
VERMILION.—Pale, or deep, 5s. per lb., 1-cwt. lots.
ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1940; September, £7 5s.; October, £7 6s. 6d.; November, £7 8s.; December, £7 9s. 6d.; January, 1940; £7 11s., February £7 12s. 6d.; March/June, £7 14s.
CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1940; September £8 2s. 6d.; October £8 3s. 9d.; November £8 5s.; December, £8 6s. 3d.; January, 1940, £8 7s. 6d.; February £8 8s. 9d.; March £8 10s.; April/June, £8 11s. 3d.
NITRO-CHALK.—£7 10s. 6d. per ton up to June 30, 1940.
SODIUM NITRATE.—£8 5s. per ton for delivery up to June 30, 1940.
CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.
AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d., pure 1s. 8½d. to 1s. 9. MANCHESTER: Crude, 1s. 0½d. to 1s. 0½d. per gal.; pure, 1s. 8d. to 1s. 8½d. per gal.; motor grade 1s. 6½d.
CARBOLIC ACID.—Crystals, 6¾d. to 7¼d. per lb., small quantities would be dearer; Crude, 60's 1s. 7d. to 1s. 10d.; dehydrated, 1s. 9d. to 2s. per gal., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 1d. per gal.
CREOSOTE.—Home trade, 3¾d. to 4d. per gal., f.o.r., makers' works; exports 6d. to 6¼d. per gal., according to grade. MANCHESTER: 3½d. to 4½d.
CRESYLIC ACID.—97/99%, 1s. 5d. to 1s. 8d.; 99/100%, 2s. to 2s. 6d. per gal., according to specification. MANCHESTER: Pale, 99/100%, 1s 5d. to 1s. 6d.
NAPHTHA.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1½d. to 1s. 3d. per gal., naked at works, according to quantity. MANCHESTER: 90/160%, 1s. 5d. to 1s. 7d. per gal.
NAPTHALENE.—Crude, whizzed or hot pressed, £6 to £6 10s. per ton; purified crystals, £9 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £4 10s. per ton. MANCHESTER: Refined, £10 10s. to £11 10s. 0d. per ton f.o.b.
PITCH.—Medium, soft, 26s. per ton, f.o.b. MANCHESTER: 24s. f.o.b., East Coast.
PYRIDINE.—90/140%, 14s. to 15s. per gal.; 90/160%, 11s. to 12s. per gal.; 90/180%, 3s. to 4s. per gal. f.o.b. MANCHESTER: 10s. 6d. to 13s. 6d. per gallon.
TOLUOL.—90%, 2s. 1d. to 2s. 2d. per gal.; pure 2s. 6d. to 2s. 7d. MANCHESTER: Pure, 2s. 5d. per gallon, naked.
XYLOL.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d. MANCHESTER: 2s. 4d. per gallon.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £6 15s. to £9 5s. per ton; grey, £8 to £8 5s. MANCHESTER: Brown, £8; grey, £9 10s.
METHYL ACETONE.—40.50%, £32 to £35 per ton.
WOOD CREOSOTE.—Unrefined, 6d. to 8d. per gal., according to boiling range.
WOOD NAPHTHA, MISCIBLE.— 2s. 8d. to 3s. per gal;. solvent, 3s. to 3s. 5d. per gal.
WOOD TAR.—£3 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—1s. 10d. per lb., for cwt. lots, net packages.
BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.
BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11d. per lb. d/d buyer's works.
m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-CRESOL 30/31° C.—6¾d. to 7¼d. per lb. in 1-ton lots.
p-CRESOL 34/35° C.— 1s. 7d. to 1s. 8d. per lb. in ton lots.
DICHLORANILINE.—2s. 1½d. to 2s. 5½d. per lb.
DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.
DINITROBENZENE.—7½d. per lb.
DINITROCHLORBENZENE, SOLID.—£79 5s. per ton.
DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 11d.
DIPHENYLAMINE.—Spot, 2s. 3d. per lb.; d/d buyer's works.
GAMMA ACID, Spot, 4s. 4½d. per lb. 100%, d/d buyer's works.
H ACID.—Spot, 2s. 7d. per lb.; 100%, d/d buyer's works.
NAPHTHIONIC ACID.—1s. 10d. per lb.
β-NAPHTHOL.—£97 per ton; flake, £94 8s. per ton.
a-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.
β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.
NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.
o-NITRANILINE.—4s. 3½d. per lb.
m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 10d. to 1s. 11d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.
NITRONAPHTHALENE.—9½d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.
SULPHANILIC ACID.—Spot, 8¾d. per lb. 100%, d/d buyer's works.
o-TOLUIDINE.—10½d. per lb., in 8/10 cwt. drums, drums extra.
p-TOLUIDINE.—1s. 10½d. per lb., in casks.
m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Latest Oil Prices

LONDON, August 16.—LINSEED OIL was dull. Spot, £27 5s. per ton (small quantities); Sept., £24 7s. 6d.; Sept.-Dec., £24 2s. 6d.; Jan.-April, £23, naked. SOYA BEAN OIL was quiet. Oriental, Aug.-Sept. shipment, c.i.f., bulk, £17 10s. per ton. RAPE OIL was slow. Crude extracted, £31 10s. per ton; technical, refined, £32 15s., naked, ex wharf. COTTON OIL was firmer. Egyptian crude, £16 10s. per ton; refined common edible, £20 10s.; deodorised, £22 10s., naked, ex mill (small lots £1 10s. extra). TURPENTINE was quiet. American, spot, 32s. 9d. per cwt.; Aug. delivery, 32s. 6d.
HULL.—LINSEED OIL, spot, £25 2s. 6d. per ton; Aug., £24 10s.; Sept., £24 5s.; Sept.-Dec., £24 2s. 6d. COTTON OIL, Egyptian, crude, spot, £16 10s. per ton; edible refined, spot, £19 10s.; technical, spot, £19 10s.; deodorised, £21 10s.; naked. PALM KERNEL OIL, crude, f.m.q., spot, £17 per ton, naked. GROUNDNUT OIL, extracted, spot, £23 10s. per ton; deodorised, £26 10s. RAPE OIL, extracted, spot, £30 10s. per ton; refined, £31 10s. SOYA OIL, extracted, spot, £25 10s. per ton; deodorised, £28 10s. COD OIL, f.o.r. or f.a.s., 25s. per cwt., in barrels. CASTOR OIL, pharmaceutical, 39s. per cwt.; first, 34s.; second, 32s. TURPENTINE, American, spot, 34s. per cwt.

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